CTIF

INTERNATIONAL ASSOCIATION
OF FIRE AND RESCUE SERVICES

article

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The Firefighters Health Commission

NUTRITION AND HYDRATION

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Nutrition and hydration in emergency service

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(Useful links will be available at the end of this article).

Anyone who is familiar with the emergency service in the fire department or in the rescue service also knows this problem: hunger, and no time to eat or no defined breaks. This is probably one of the main reasons why it is not at all easy to eat healthily during shift that often last for 24 hours. It is not uncommon for hunger to be satisfied with fast food in between meals - often in the middle of the night - or with convenient foods, but usually not in a very sustainable way. Although emergency service usually also involves a certain amount of physical activity, sometimes considerable, many colleagues gain body weight over the years. The result can be reduced performance and other illnesses such as high blood pressure, cardiovascular disease, and cancers (link 1 and 2). This could be avoided if a needs-based and healthy diet played a greater role on duty (and at home, of course).

HEALTHY EATING, WHAT IS IT ANYWAY?

Since the term "healthy nutrition" is not self-explanatory, the German Society for Nutrition (link 3) has drawn up 10 rules that fill it with content and thus help to eat a wholesome and balanced diet.
These rules are not difficult; for most of us, some of them will even be banal and seem superfluous, while, for others, they will be difficult to implement. At whatever point individuals want to change their eating habits, it should be clear that it is often a matter of changing lifestyle, not following a temporary diet.

Kenneth Brockmann / pixelio.de

ASSESSMENT OF ACTUAL STATUS

In order to be able to decide for oneself where one's eating habits might need improvement; it first makes sense to survey one's own current nutritional status. Various parameters can help here; many people are familiar above all with the body mass index (BMI), i.e. the quotient of body weight in kilograms and the square of the body length in meters. Without taking age groups into account, BMI values between 18.5 and 24.9 m/kg² are defined as normal weight. The weaknesses of this value naturally lie in the fact that the body composition is not taken into account, i.e. 10 kg more fat increase the BMI just as much as 10 kg more muscle mass. This is one of the reasons why other

parameters such as waist circumference (abdominal circumference at the narrowest point below the ribcage) are taken into account. Values of 102 cm in men and over 88 cm in women are defined by the WHO (World Health Organization) as the threshold values for so-called "visceral obesity", above which the risk of diabetes and cardiovascular disease is considered to be significantly increased.
However, the assessment of the "actual condition" from a nutritional point of view includes not only these values and the question of the individual components of the diet, but also more general aspects of lifestyle: Do you sleep enough? Do you avoid stressful situations? Do you smoke actively or passively? And above all, do you get plenty of exercise? In the field, some negative factors such as lack of sleep and stress can hardly be changed completely in the first responders working lives, so it is all the more important to take advantage of the modifiable possibilities.

MORE CALORIES WITH EXERCISE

An average of 30 to 60 minutes of physical activity or exercise daily is recommended. More than an hour a day generally does no harm, but may require an adjustment in dietary habits, especially energy levels and fluid intake. For the - also ambitious - recreational athlete the following applies: A special nutritional composition is not necessary, especially the consumption of so-called "ergogenic" (performance-enhancing) products/substances is mostly ineffective and does not stand up to scientific scrutiny. This also applies to the intake of dietary supplements such as vitamin preparations or similar outside of special indications during pregnancy, breastfeeding or in the case of proven deficiencies.
But what should a healthy, complete, and balanced diet look like? Of course, all the following information applies only to healthy people. People with previous illnesses or those taking medication may need to adapt their diet to their particular situation.
First of all, the energy content of the diet should be in line with requirements. As a guideline, one can calculate with a (resting) basal metabolic rate of 1 kilocalorie (kcal) per kilogram (kg) of normal body weight (KG) per hour. This means for a 70 kg standard person: 1 x 70 x 24 = 1680 kcal resting requirement per day. 1 kilocalorie (kcal) equals 4,18 kilojoules (kJ).
Add one third for light physical activity, two thirds for medium activity (e.g. an additional hour of casual running), and double the resting metabolic rate for high activity levels. Example: For one hour of daily running in addition to otherwise light, e.g. office activity, the daily energy requirement is approx. 1680 + 560 + 560 = 2800 kcal. Firefighting/rescue duty outside of special situations will rarely have higher energy requirements. People tend to overestimate these requirements based on physical activity. (Examples for reference values: link 4)
Thus, the recommended daily energy intake depending on physical activity would be - roughly estimated:

Body weight	Resting	Light activity	Medium activity	High activity
75 kg.	**1.680 kcal**	**2.240 kcal**	**2.800 kcal**	**3.360 kcal**
100 kg.	**2.400 kcal**	**3.200 kcal**	**4.000 kcal**	**4.800 kcal**

USE HIGH-QUALITY FATTY ACIDS

At least 50 %, but preferably 60 % of this energy content should be administered with carbohydrates (CH), 10 to 15 % with protein (makes approx. 0.8 to 1 g protein/kg a day) and 25 to a maximum of 30 % as fat (fatty acids). With the latter, the composition is particularly important: High-quality fatty acids (mostly of vegetable origin) should be preferred to ensure the recommended intake of the essential omega-3 and omega-6. The most important omega-3-fatty-acids are found mainly in wild caught fish, nuts (the peanut is NOT a real nut, but a legume!) and in grapeseed and linseed oil. The supply of omega-6-fatty-acids is usually not a problem and is rather abundant: it can be found in sunflower, safflower, and corn oil. The recommended daily amount of total fat in the diet is 1 gram of fat per kg body weight; with an energy content of 9.3 kcal/g, our example human would thus consume 650 kcal from fat. Carbohydrates are also differentiated. The proportion of polysaccharides in the diet should be higher than that of monosaccharides (such as glucose or fructose), since foods with polysaccharides contain a higher level of nutritionally beneficial nutrients and fiber. For the same reason, when choosing between vegetables and fruit, one should also tend to favor the vegetables; the best would be 3 servings of vegetables and 2 servings of fruit (together about 700 g) a day - one of which can also be a glass of fruit or vegetable juice, for example. Vegetables retain more flavor, nutrients, and vitamins if they are cooked only briefly, with little water and fat and at a low temperature.

Christina Winter / pixelio.com

MAXIMUM 600 GRAMS OF MEAT PER WEEK

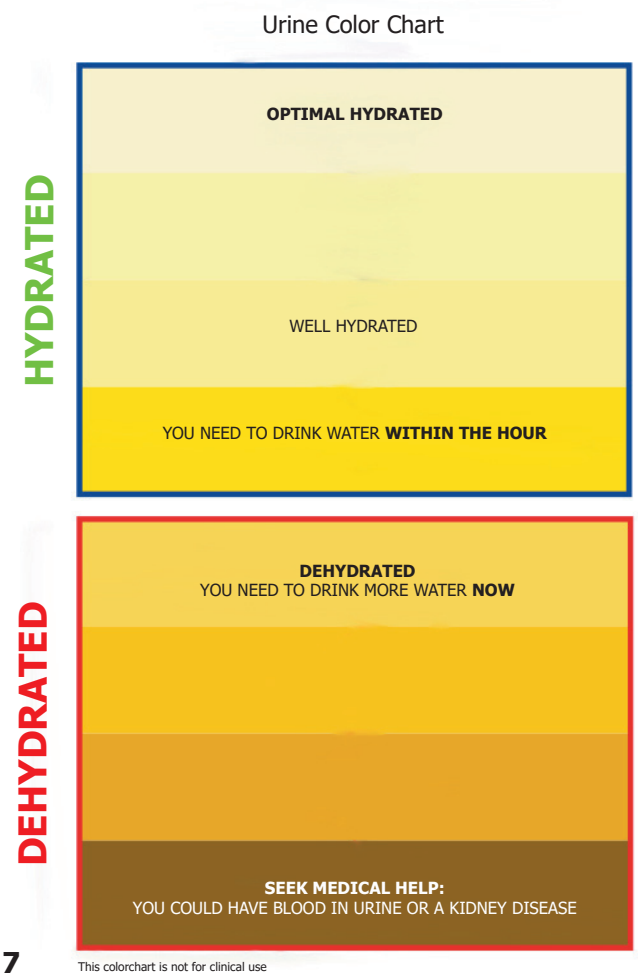
In general, the production and preparation of food play a decisive role: unprocessed meat and sausage products are generally of higher quality than processed ones because they contain less fat and less salt. Even if many people like to eat meat and sausage: only a weekly amount of 300 to 600 g of low-fat meat or sausage is recommended, as well as restraint in the consumption of eggs and alcohol. On the other hand, the daily consumption of low-fat milk or dairy products is desirable. Many convenience foods, baked goods and confectionery contain large amounts of sugar, salt, low-quality fats (palm oil, coconut oil), flavorings and flavor enhancers. This basic rule - "process food as little as possible" - also applies to the most important group of nutrient suppliers together with vegetables and fruit: Cereal products as well as potatoes. Bread, rice, pasta and other cereal products made from whole grains contain significantly more vitamins, secondary plant compounds, minerals and fiber than products made from milled grains. Together with low-fat ingredients, they provide the basis for a wholesome diet.

FLUID INTAKE

Sufficient fluid intake is vital because our body consists of about 50 % water. Water fulfills and supports many body functions. It is an important part of cells and body fluids, regulates body temperature and transports nutrients. The kidneys use water - the urine - to excrete waste products. This water loss and the losses through breathing and sweating must be replaced.

Adults should drink at least 1,5 liters of water each day. Drinking water regularly, preferably with every meal and in between meals, protects the body from a lack of water. Those who feel only a little thirsty should pay particular attention to drinking regularly. Less than 1,0 liter of water per day is not sufficient to supply the body with fluid. In some situations, the body needs particularly a great deal of fluid, for example in extreme heat, extreme cold, fever, vomiting and diarrhea. Also, during physically strenuous work or sports, more fluids are needed. This can be an additional 0,5 to 1,0 liters of water per hour. Drinking too much fluid does not harm a healthy organism. Healthy people simply excrete excess fluid through the kidneys.

Suitable are water, herbal and fruit teas without sugar and juice spritzers (1 part juice and 3 parts water). Lemonades, cola and fruit juice drinks, fizzy drinks, nectars, iced teas, or coffee drinks - these beverages are not ideal as thirst quenchers, because they contain a lot of sugar and thus provide many calories. Coffee and black and green tea without sugar, can be added to the fluid balance like water. However, they are primarily stimulants and not thirst quenchers. They contain caffeine and theobromine. These are natural ingredients that stimulate and invigorate. For healthy adults there are no reasons to discourage a moderate consumption of 3 to 4 cups per day.



With this urine color chart you will be able to mach the color of your own urine and decide if uou need to drink more water in order to stay well hydraded.

We recomend that you print this out (page 7) as a A4 poster and place it in every toilet in your station where you can see it while you urinate.

With all the rules and recommendations, one thing must not be forgotten: Eating is fun, and it would be wrong to spoil the fun of eating with this advice. People do - if they have the choice - only what they like to do. So first, pick the recommendations that are easy for you to implement. One thing is for sure: if you enjoy it and eat and drink healthier, you will feel better and there is the chance that you will live longer.

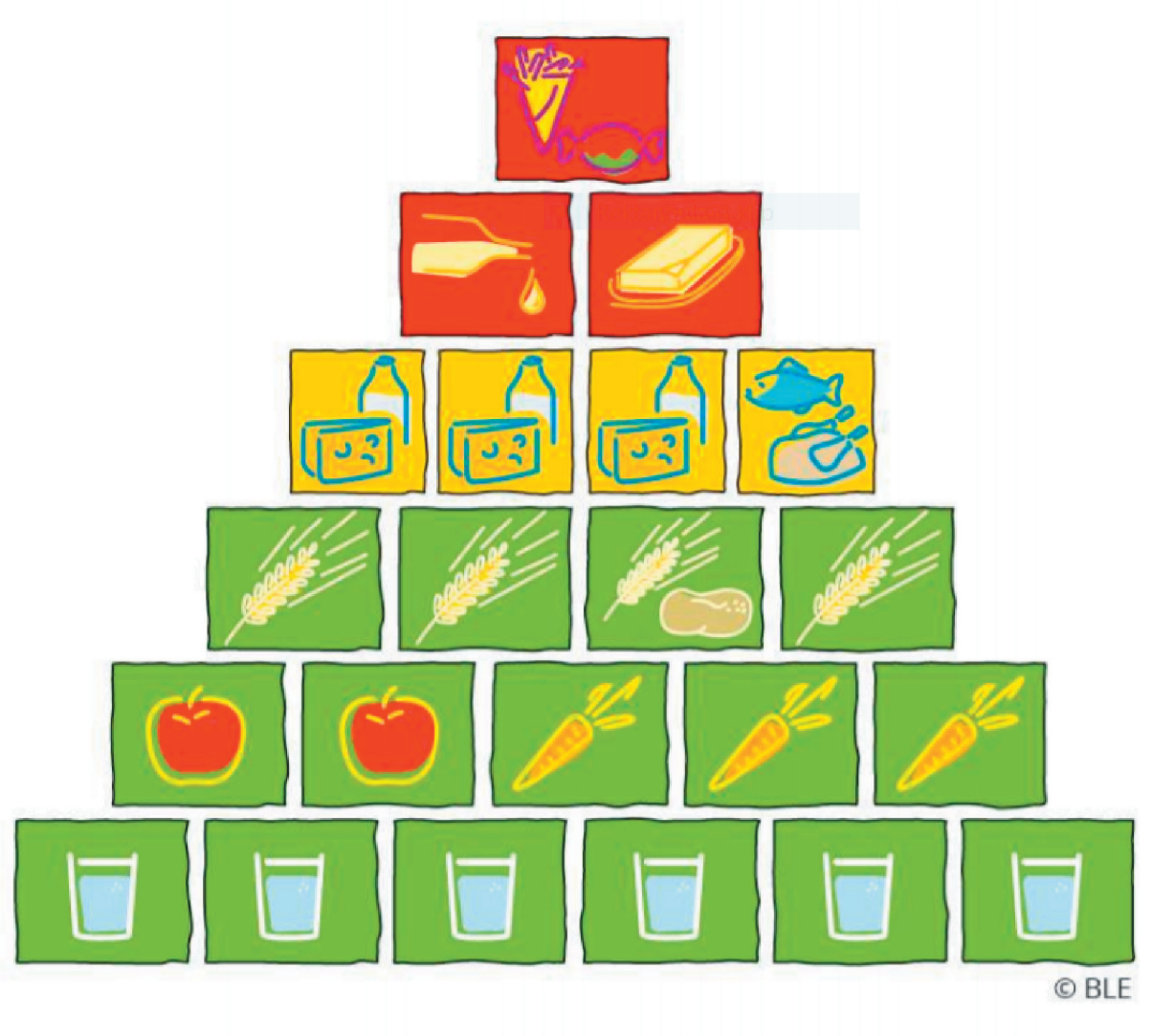
Useful links for detailed knowledge.

1. https://www.cancer.gov/about-cancer/causes-prevention/risk/obesity/obesity-fact-sheet#what-is-known-about-the-relationship-between-obesity-and-cancer-

2. https://www.cdc.gov/healthyweight/healthy_eating/index.html

3. https://www.dge.de/ernaehrungspraxis/vollwertige-ernaehrung/10-regeln-der-dge/

4. https://www.cdc.gov/healthyweight/healthy_eating/index.html



Nutritional pyramid, www.bzfe.de

Urine Color Chart

HYDRATED

OPTIMAL HYDRATED

WELL HYDRATED

YOU NEED TO DRINK WATER **WITHIN THE HOUR**

DEHYDRATED

DEHYDRATED
YOU NEED TO DRINK MORE WATER **NOW**

SEEK MEDICAL HELP:
YOU COULD HAVE BLOOD IN URINE OR A KIDNEY DISEASE