

# A Food Pyramid for Swiss Athletes

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Earlier this year, I enjoyed an opportunity to speak at the Swiss Forum for Sport Nutrition in Zurich, organized by Dr. Paolo Colombani. One of my fellow presenters at this forum was Samuel Mettler, a graduate of the Movement Sciences and Sport course at the Swiss Federal Institute of Technology (ETH Zurich). Samuel is about to finish his doctoral thesis on the glycemic index in sport and the influence of protein intake during weight loss in sport and was involved in the development of the Swiss Food Guide Pyramid for Athletes. In this interview, we ask Samuel to tell us more about how the food guide pyramid was developed.

*Sam, tell us more about your nutritional background and current role in sports nutrition in Switzerland. What led you to become involved in this project?*

After my master's in movement science and sport at the ETH Zurich, I followed a second postgraduate course in human nutrition and worked for a year as a research assistant in the nutrition biology group at the Department of Agricultural and Food Sciences until I started my PhD. I focused on physiology and sports nutrition during all my studies. As an athlete I was always particularly interested in applied sports nutrition, and when I got involved in the Swiss Forum for Sport Nutrition a few years ago, I was basically in the core of sports nutrition in Switzerland.

*Can you tell us more about the Swiss Society for Nutrition and their food pyramid for healthy adults? Who is this group? How is the basic food pyramid used in Switzerland, and what other education resources or concepts are used to promote healthy nutrition for the general population?*

The Swiss Society for Nutrition (SSN) is the officially recognized nonprofit nutrition organization that is closely cooperating with the Swiss Federal Office of Public Health, Health Promotion Switzerland, and the Swiss Academy of Sciences. The main goals of the SSN are nutritional education of the Swiss population, bridging nutrition science and applied nutrition, and supporting nutrition research. The food pyramid of the SSN was introduced in 1998 and updated in 2005 and is well known in Switzerland. All stakeholders in the field of nutrition support it, and it is the official communication tool used by the dietitians. After the food pyramid for adults, the SSN just developed the

*Nutrition Disk for Children* because it was felt that the children would better understand recommendations in form of a disk.

*So where does the Swiss Forum for Sport Nutrition fit into the picture? And the status of your pyramid—does it carry the same “official position” as the basic food pyramid?*

The Swiss Forum for Sport Nutrition is a collaboration of a handful of sport nutrition scientists and is supported by the ETH Zurich and Swiss Olympics. The main goal of the forum is to disseminate scientifically funded information on sports nutrition by using a “simple language.” The idea of developing a pyramid for athletes was born a couple of years ago. The pyramid was developed together with the Swiss Federal Office of Sport, which made the layout of the pyramid and also printed it. The development of the pyramid was also supported by the Foundation for Promotion of Nutrition Research in Switzerland. By using the pyramid of the SSN as a basis, our sports pyramid has, in some sort, “adopted” a semiofficial status.

*Did your group always intend to “piggyback” on this basic pyramid, or did you discuss starting from scratch with your own education concept?*

Well, the idea of building a food pyramid for the athletic population is an old one of Paolo Colombani’s. In fact, there were attempts or concepts in the past that failed and were abandoned. It was during the time before my PhD when I was working as an assistant that we started a new effort. Around this time, the updated pyramid of the Swiss Society of Nutrition was released, so it was a good opportunity to try to build an extension of that pyramid. One argument was that this would allow for more consistent communication in Switzerland, as we could always work with the same pyramid. And, it turned out quickly that this particular pyramid had some important advantages. For example, the horizontal layering and the relatively simple classification of food groups allowed a simple message to be constructed. Other food-guide pyramids from around the world might not have been so easy to extend for athletes. In addition, we already had nutrient-intake data from a validation project of the SSN pyramid—these looked as if they could be easily expanded for the sport purpose.

The bottom line was that there was no need to invent something new. And the piggyback strategy looked quite tempting anyway, because sports nutrition is basically nothing other than a well-balanced diet—it just includes a bit more of some things. This message is quite visible in the present concept, and I don’t think this is a disadvantage. If we designed our own concept from scratch, we probably would have ended with a similar concept—maybe, I don’t know. If we lived in another country, we probably would have chosen something else as a basis. Maybe it was just luck that it worked pretty well with this pyramid.

*Who is the target audience that you hope will use the pyramid? Is it meant for athletes and coaches themselves, or is it for the nutrition professionals who work with the athletes?*

Well, it was always our goal that the pyramid be readable for laypersons, athletes, and coaches. However, if dietitians or nutritionists use the pyramid as an educational tool to explain sports nutrition to athletes, this might be its biggest benefit. Actually, the pyramid is a rather general guideline to help select the appropriate quantity and type of food for athletes, but dietitians might help athlete adapt the pyramid to the very individual needs of their sports.

*Is its primary purpose to set menus and food plans for athletes or to help assess the adequacy of athletes' existing food practices?*

I think you can go both ways with the pyramid. On the one hand it is possible to design meal plans with it. But in practice you would probably go the other way, and athletes, on their own or together with a dietitian, can check whether their diet more or less fits with the pyramid—or where there are discrepancies and how they could be fixed by choosing servings from other food groups.

The most important message of the pyramid is probably to show athletes how many servings of which food group make sense depending on individual training volume. Athletes definitely need more food than couch potatoes, but not all athletes realize how much more and what they should eat more of. Therefore, athletes can design new meal plans with the pyramid, or at least they can bring in more variety in daily eating patterns by realizing that foods from the same food group are interchangeable. For example, many athletes don't even realize that pasta and rice are both good and interchangeable carbohydrate sources. The pyramid might help these athletes structure their eating plans, ideally with the support of an experienced dietitian.

*You have targeted “athletes” who are doing more than 5 hours a week of moderate-intensity exercise. How did you decide on this criterion?*

That's a good question. This cutoff of 5 hours does not—admittedly—have a clear scientific justification, nor does it reflect any official guideline. It is based on . . . sound gut feeling. In any case, we needed to define a cutoff to make a distinction between the recommendations for healthy but mildly active people—the basic pyramid—and really active athletes. How did we come up with the figure of 5 hours and not 6 or 4? Well, a recreational jogger who jogs two or three times a week does not really have any special nutritional needs. Such a physical activity level should be seen as part of a healthy lifestyle, and the corresponding nutritional needs are covered by a basic well-balanced diet. Special needs—particularly regarding energy and macronutrients—start with a certain training volume. We felt that 3 hours per week or less than half an hour per day is certainly below that volume. On the other hand, 1 hour per day or 7 hours per week is likely above that volume. So we selected something in between. The “critical” volume is certainly debatable, and we are open to any better suggestion.

*How can the pyramid be adjusted for athletes who do primarily high-intensity exercise or activities of low-intensity or skill?*

That's indeed a very critical question. You are right. The pyramid is designed for a moderate intensity. This means, theoretically, that the energy needs of an athlete exercising very hard might be underestimated. And on the other hand energy needs could be overestimated for athletes with a relatively low average training intensity—for example, gymnastics, sports with very low endurance components, or sports that are mainly skill based. In this case the pyramid needs a more flexible interpretation. For example a gymnast could interpret the pyramid differently by eating only for 1 hour according to the pyramid when exercising for 2 hours. Or vice versa: If an athlete exercises extremely hard, he or she could eat for 3 hours according to the pyramid after a 2-hour training session. Finally, the average intensity for which the pyramid is theoretically calculated is mentioned in the accompanying text. Therefore, everybody can judge whether they are exercising more or less intensely and can decide if there is a need to round the servings per hour a bit up or down. Of course, the pyramid does not clearly answer what to do after a 2-and-a-half-hour training session. . . . One might round up to 3 hours, while the other might rather round down to 2, depending on the individual's estimated training intensity. I think there are so many variables in real life that we should not get wound up in these theoretical problems—although these theoretical problems do indeed exist!

*The way the pyramid works is to allow extra servings of key food groups according to the number of hours of moderate exercise undertaken each day. For example, for every hour of exercise, it is recommended that an extra 400–800 ml of fluid, one cereal serving, and half a fat serving be added to the diet. By contrast, servings of meat/dairy and fruits/vegetables are not increased as exercise load increases. How can you be sure that this scaling of food intake will meet the special nutrition needs of athletes? Can you explain to us how you did your food modeling to validate the pyramid concept?*

Well, the pyramid is based on a lot of calculations. Basically, we first set an additional energy need per hour of exercise. Then we distributed this energy among servings of different food groups, considering the additional macronutrient needs of athletes. We also made qualitative considerations about usability in real life. At the beginning we obviously considered additional servings for all food groups, including, for example, meat and dairy products. However, the basic pyramid already includes a fairly high protein intake of about 1.5 g per kg body mass. In other words, the protein intake was already at a level consistent with the protein recommendations for athletes at “zero hours of sport.” Additional servings per hour of exercise, however, actually lead to additional protein intake, in particular from the carbohydrate food group (grain protein and sports food like bars or recovery drinks). This leads to a protein intake of about 1.9 g of protein per kg body mass when eating for 3–4 hours of exercise per day. Additional servings from the meat and dairy food group would push the protein intake up to 3 g per kg body mass or more, so we skipped additional servings from this group. Actually, the present situation has an important advantage: The protein intake in sports with relatively low

energy budgets, including particularly strength and sprint events, is already high with few extra servings.

As you pointed out, there are no extra servings in the fruit and vegetable group. I don't think that there is any rational to recommend more servings from this food group, although we stated in the pyramid that more servings can be eaten, provided that no gastrointestinal problems occur. And this is probably the limiting factor. Too many servings of this food group, particularly in combination with very high training volumes, could cause gastrointestinal problems or prevent athletes from consuming enough energy. Theoretically, one could even think about reducing the number of servings in this food group for very high training volumes. But this would probably have been the wrong message. Finally, we saw no need to include extra servings of the foods in the top of the pyramid. In special situation, however, for example, for carbohydrate loading or for extremely high energy needs, these energy-dense foods become more important, but a general recommendation for extra servings in this food group could be a wrong signal. In real life most athletes will probably stretch the "use sparingly" formulation to the max anyway. We just couldn't cover all special situations with a single pyramid.

In the end we validated the final version of the pyramid by designing meal plans for 168 days for athletes of different body masses and with different training volumes. This validation process showed that the energy, carbohydrate, protein, and fat intake were within a reasonable range and according to internationally accepted recommendations for athletes. The micronutrient supply was well beyond the RDA for nearly all micronutrients. We detected only a relatively low intake of vitamin D, but this is a common observation and not a specific problem of our pyramid.

*The information accompanying the pyramid points out that the basic pyramid for nonathletes does not require daily adherence to recommended servings. However, you encourage athletes to use their food pyramid on a daily basis to account for their exercise needs and adjust food servings each day—that is, micromanage on a daily basis. Did you think about making recommendations on an even more acute timescale than that? For example, to adjust for fluid intake, it is recommended that athletes consume drinks before, during, and after exercise. Did you consider adding "timing" recommendations for protein- and carbohydrate-containing foods, in relation to a session of exercise?*

Yes, we certainly thought about that. Obviously, how you time your food and nutrient intake before, during, and after training plays a role. And the higher the training volume gets the more aspects become important. I think in particular of situations with several training sessions per day when gastrointestinal discomfort and food tolerance might become another critical issue. Nonetheless, we had to set priorities. It will never be possible to integrate all information and knowledge on sports nutrition into a single figure with a limited accompanying text.

Because the pyramid's primary function is to say what and how much to eat, this information had highest priority. Next to that, we included additional information if possible. For example, with sports drinks we had some room—considering the layout—to give additional advice in a few words. It was always a trade-off what to include and what not. We often balanced the “keep it simple and stupid” principle against providing additional information. We are curious about what feedback we will get, and maybe we will change priorities in a new version of the pyramid.

*You have tackled a very challenging task—distilling complicated issues of sports nutrition into an easy guide and offering both quantitative and qualitative advice. You have accounted for differences in the duration of exercise and accommodate differences in athletes' body size by acknowledging small and large portion sizes of your food servings. You have also tried to provide guidance on when carbohydrate-containing fluids are useful in exercise and when water is an appropriate choice. In other words, there is a lot of information assembled into a single page. Were there other issues that you wanted to include but didn't have room for or couldn't find a way to ensure that the message “worked”?*

That's right; there is a lot of information in the pyramid. And you are also right, that there is a lot of information that could not be included. I think the most important missing pieces of information are the timing aspects we discussed before. Many foods, in particular, sports food like energy bars, gels, or recovery drinks, have their most important uses at specific time points around training. Conversely, it's probably not reasonable to eat a large salad shortly before a hard training session. Another aspect is that priorities might change between sports or during the course of a season. Furthermore, information about food processing and storage could influence the nutritional value and digestibility of food items. So, there remain some things for sports dietitians or nutritionists to tell athletes. As discussed before, however, it was often a trade-off, and priorities had to be set.

*It is early days in the life of this food pyramid for athletes, but what has been the response? Where do you think it might be able to go in the future? Will it be taken up by other countries? Will it be used to plan menus or advice for athlete dining halls at international events? Does it have a role for the food industry?*

So far we have received some response from the German-speaking area. In particular, newspapers and running or fitness journals in Germany and Switzerland have reported on the pyramid. It also has already been incorporated in a textbook about food for athletes. It definitely seems to be very popular with sports dietitians as a new tool for mediating sports nutrition. The Swiss Federal Office of Sports has already printed and distributed thousands of copies of the German version of the pyramid. So, the pyramid really seems to have turned out to be a valuable educational tool. I have no information at this time on

how many prints have been sent to other countries, but the pyramid has been downloaded more than 1,300 times during its first 2 months on our Web site. I think this pyramid is a unique tool at the moment and it might have some potential for being picked up in other countries around the world. A possible limitation could be the different eating traditions in different cultures, so other concepts would be needed.

I could imagine its use in athlete dining halls, particularly in training bases, where it could help athletes make good choices about what and how much to choose according to their actual training volume. In this situation the pyramid could fully play its role as a nutritional guidance tool. When looking at international events, it could also make sense, particularly for athletes who are already familiar with the pyramid. If, however, an athlete follows a completely different eating pattern it would probably be wiser to take home a copy of the pyramid and to start changing and improving food selection after the event.

There could also be a role for the food industry. For example, sports food could be specifically labeled and allocated to certain food groups: for example, sports drinks to the fluid group; bars, gels, and carbohydrate-protein-recovery products to the grains and cereal group; and so on. So athletes could more easily identify which product to choose as an additional serving for which food group. However, it's hard to even roughly estimate how broadly the pyramid will be used in the future. Maybe its use will spread quickly, maybe not, or maybe other concepts will appear. We will see.

*In hindsight, is there anything you would have done differently while producing the food pyramid?*

Well, as I mentioned there were completely failed attempts before this pyramid project was started, and during the development of the current pyramid we had to digest some errors. But so far I don't see a fundamental strategic error. If we had to restart the whole process, we might streamline it a bit more. In the beginning we brainstormed a lot about how to proceed, how the final message would look, and so on. There was a lot of uncertainty and a lot of thinking about concepts. When you look at the pyramid now, you could probably say, oh, that looks like something simple. But it was a rocky way to go. However, if it is really recognized as something simple now, we have achieved our aim.

*Where can readers get more information about the food pyramid for athletes?*

The pyramid can be downloaded free from our Web site for private use. At the moment we are a bit restricted in giving out all background information because the scientific publication has not yet been printed. As soon as the paper is out, we will also put more background information on our Web site. Nevertheless we invite everybody to give us feedback about their experience with the pyramid or suggestions for improving the present version.

[www.sfsn.ch](http://www.sfsn.ch) (main page, German)

[www.sfsn.ethz.ch/index\\_EN](http://www.sfsn.ethz.ch/index_EN) (English page)