Sports And Performance Nutrition

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Week-01

Lecture-04: Carbohydrate Manipulation for Sports Performance

In the carbohydrate chapter, we learn that carbohydrates are the crux of fuel for an athlete. So, let us understand how athletes can manipulate carbohydrate to suit their training requirement. Choosing different food sources of carbohydrate can depend on what is called as glycemic index. So, in this topic, we will learn what is glycemic index, how can we adjust the glycemic index of a carbohydrate food and how can glycemic index impact a training session. Of the micronutrients, carbohydrates are the major fuel source. Each carbohydrate food is assigned a glycemic index.

To make this simple, glycemic index is how fast it can give you energy or glucose for exercise and based on how fast the food can be digested and absorbed, foods can either be high, moderate or low glycemic index. But there is a catch. Glycemic index is a measure of the quality of the carbohydrate, but it is also influenced by the quantity or the portion of that food that you will eat. So, the amount of food or the portion of that particular food that you will consume is called the glycemic load.

Similar to how the food is assigned a glycemic index number, based on the amount of food that needs to be consumed in a sitting, the food is also assigned a number based on also the amount of food that needs to be consumed. The glycemic load is categorized as high, medium and low. So to give you a context and an example, watermelon fruit has a high glycemic index, but you will need to consume a very large portion of watermelon in order to gain that sugar surge. Therefore, to give you an example, watermelon has high glycemic index, meaning that it can give you higher sugar amounts. However, you will need to consume a very large portion of watermelon and therefore the glycemic load of watermelon is still very low based on how fast the carbohydrate food can be digested and absorbed.

They can be low GI typically which are slow digesting, the ones that are modest GI and the ones that can be very very fast digesting. Each of this food choice has a significance for a different type of athletic training. So each of these types of different carbohydrate foods can be adapted to different training scenarios. So when can athletes choose the low glycemic index carbohydrate foods? If an athlete is looking to enhance training adaptation, lower the fat mass, provided you are under calorie restriction, consuming moderate to low GI foods that take

longer to digest can enhance fat oxidation. That leaves us with the exact contrasting situation of when should an athlete use high glycemic index carbohydrate foods.

The fast digesting carbohydrates are the best fuel option if you are consuming a meal too close to the training time. That way an athlete can ensure there is a quick source of energy with these fast digesting carbohydrates. What about a very long time of exercise? We know that the liver glycogen can last about one and a half to two hours of a training time and that can vary too based on the intensity and we know that to sustain a consistent level of performance you need to keep supplying carbohydrates and that can happen when you consume carbohydrate snack that is very fast digesting and very quick source of energy in between the workout and that is an intra-workout meal. Similarly a high GI carbohydrate snack can really optimize the recovery of the liver glycogen particularly if an athlete is training one session and jumps into another training session and this is typically seen where they are doing a sports specific training and that sometimes can be followed by a gym session or a strength and conditioning and they have to recover quickly and they have to have a sustained energy requirement to sustain a few hours of workout. If an athlete is preparing for a competition day even in carbohydrate loading or in the peak competition cycle when the demands are very high sometimes high GI or the fast digesting carbohydrates are very effective and many times if an athlete is underweight or is an ectomorph to sustain the body weight so that the athlete is not losing also muscles adequate carbohydrates are needed and in that scenario high GI foods can be beneficial.

For a peak competition season athletes can have a very very high demand of carbohydrate intake each day anywhere from 7 grams all the way to 10 or even 12 grams of carbohydrate in a day that is 600 grams of carbohydrate each day. To give you a context a slice of bread a medium fruit or even a roti of approximately 2 tablespoons of ata can be 15 grams of carbohydrate for those kind of training periods more than 60 and 70% of your full calorie intake can come from carbohydrate foods. If you consume the lower glycemic index of carbohydrates which are the slower digesting due to higher fiber content consuming larger portions can lead to a bit of gastric distress which can be the flatus due to the digestion of the insoluble fibers which ferment in the large intestine and that typically can lead to a bit of bloating and gas. So what are some of the best high glycemic index options? The typical Indian meals can offer very simple easy to digest high GI food choices from the white rice, the curd rice idli, khichdi, pongal, dosa and several other rice preparations which is depicted in these photos. The rice preparations such as the puffed rice or even the rice flakes which is poha can be a very good option for a high GI choice apart fueling a workout before and also during a workout high GI foods can also enhance the recovery of muscle glycogen.

For an intra workout the best way to consume a high GI option which can also give you electrolyte of sodium is a puffed rice ladoo. Consuming a typical Indian mixed meal thali will anyway slow down the digestion of carbohydrates. So there is no need to choose an unpolished grain particularly if you are going back to training again. So eating even polished white rice is helpful. If it is a main meal that is consumed before the workout you would ideally want to

give a gap of 1-3 hours but if you require a light snack and you want to consume it closer to your training then an average 1 gram per kg body weight is a good adequate amount of a carb amount that can roughly be a couple of slices of bread with a teaspoon of jam and a banana.

During the workout about 30 grams for every hour of exercise and then you keep building the amounts by the hour of extended for a long workout. Similarly after a workout you can plan the carbohydrate amounts based on the way your training is scheduled. So what can be different about a slice of bread from say a sponge cake or a muffin in this photo. So, several athletes ask us on competition day can I eat something tastier and my answer will be what is your requirement and objective of that snack. Adding various other nutrients be it the butter which is a fat which gives you over double the amount of calories or even some eggs which can be a source of protein will change the way the carbohydrate is absorbed.

While a bread is made majorly also from a lot of refined flour called maida which can make it hygienic but the minute you add the protein the fat convert it to a baked item. The glycemic index can get lowered which means that it will take the body to digest that much longer. What about liquid meals you may ask yes liquid meals can be a faster source of energy so porridges milkshakes definitely offer carbohydrates faster than what can be a full plated meal of several other nutrient combination. In my practice these are some of the food options that are typically consumed before a workout by athletes and of course there is also a sense of convenience to using these packaged food options. The bread that comes readily processed cornflakes which is eaten straight out of a packet and today you have pasteurized milk and milk that comes either in a packet or a tetra pack which can be consumed straight out of the tetra pack and what is common of all these food choices they can be a quick source of energy choosing lighter food options closer to the training time often eases digestion while obviously keeping the fat protein and the fiber content to minimum is desirable.

Some slow to moderate GI food options can be swapping the potato to sweet potato a banana to an apple and of course combining your katori of dahi with the fruit. When the liver glycogen starts going down after about an hour of physical activity and an athlete needs the extra energy consuming some foods to sustain the training is but inevitable and we also discuss the synergy of the carbohydrate foods to aid the muscle contraction by also releasing the calcium ions to support this function. Apart the banana which can offer approximately 25 grams of carbohydrate 3 to 4 dates can be consumed within the first hour of workout and of course a glass of milkshake or smoothie made of curd can also be a good source of not just protein but also carbohydrate if you add a fruit in that. Choosing high GI foods to not only fuel your workout but also from the recovery of a training session is very helpful. After a training session if you're closer to a main meal you can consume your rice and roti after the training an athlete can choose high GI options as a fruit or milk and if the training is closer around the main meal then they can consume from rice roti to aloo which can offer good amounts of carbohydrates.

We discussed of how the fast digesting or the high glycemic index carbohydrate foods can be manipulated before during and after workout and that is on a typical full training day but what could that mean for an athlete who is training daily across the week to be specific there are

days where an athlete needs to choose high GI carbohydrate choices say for example on a high intensity training day or the days when cardio is being practiced where the carbohydrates offer extra energy for that workout if an athlete is practicing strength training the athlete may not necessarily have to consume a high carbohydrate or a high GI meal instead simple things what we just discussed in the last few minutes even choosing a fruit as an apple with extra 5 grams of fiber from the pectin can be a moderate glycemic index choice before the workout. Interestingly if the athlete is looking to lower the fat percentage the gym session itself can be a faster workout what happens on days when the athlete has a single training session maybe sometime in the first half of the day in that case the athlete can choose moderate to low GI food options around the non training time. Similarly on a rest day the athlete can choose similar slow digesting carbohydrate option with higher fiber content when one doesn't need the high requirement of fast digesting carbohydrates or the energy surge so that way an athlete can choose from low glycemic index all the way to high glycemic index carbohydrate choices to suit his training requirement across the week. The best option for the athlete is to choose carb cycling for a non training day or even a non training time based on the need consuming high fiber food choices and low carbohydrate or low glycemic index foods can help training adaptations and help maintain the body mass along with the fat mass and on days of higher training load consuming high carbohydrate intake along with the high GI or the higher glycemic index food choices can not only optimize the performance give you more power to work out and also enhance recovery from training so that way each athlete can tailor their carbohydrate type and the amount to suit their training requirement. Working with a qualified sports dietitian or nutritionist can help you to customize your requirement to suit your training periodization.

To summarize high GI carbohydrate choices can fuel high intensity workout especially if there is very little time between the consumption of the meal to training adding protein fats fiber such as even a non polished grain along with vegetables or salads can slow down the digestion process lowering the glycemic index of that meal. Low glycemic index carbohydrate choices such as unpolished grains along with more protein or salads can be consumed around a non training time and rest days. I hope these tips on how to adjust your carbohydrate to suit your training has helped you. Thank you for listening. Hi I am Shalini and I am a national level swimmer so we all do like festivals and going to parties how do I compensate it.

I go there eat rich meal and when we eat rich meal we have to compensate and maintain your weight so what do I do is the next day is eat more of salads rich protein food drink water and exercise being an athlete and more of protein like tofu chicken and exercise a lot.