



Squads Program

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EDUCATION PAPERS

VOL 1 - NUTRITION

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4th LANE SWIM ACADEMY





PART 1

FUELING FOR PERFORMANCE

FUELING FOR PERFORMANCE

- If you want to keep up the good work in the water and during the dryland program, you have to plan ahead and get the most out of your recovery.
- Other than having good sleep habits, nutrition is the biggest factor that determines the quality of your workouts and therefore: your athletic performance.
- By the end of a tough workout, your muscles have torn themselves apart, you sweated out litres of fluid and ran your sugar fuel tank dry; all of this needs to be fixed, and the clock is ticking because the next workout is coming up fast. If you neglect your nutrition, you are compromising your ability to fully benefit from the training program and therefore, your progression.
- Fuelling for performance is a matter of maintaining a daily food and fluid intake routine that is sufficient and appropriate, and taken at the right times, to support high quality training, promote optimal adaptations and sustain overall health.

FUELING AT A GLANCE

- The brain, which ultimately controls all body movements and functions, relies primarily on blood sugar for fuel.
- The immune system relies primarily on glutamine to function properly, sufficient stores of which rely on sufficient dietary intake of carbohydrate.
- Explosive movements rely heavily on glycogen (the storage form of carbohydrate in muscles and liver); fatigue is directly linked to glycogen depletion.
- Fat and protein support overall body function; proteins provide the building blocks of all tissues via their constituent amino acids.
- Athletes consume dietary protein to repair and rebuild skeletal muscle and connective tissues following intense training bouts or athletic events.



FOOD IS FUEL

CARBOHYDRATE	Carbohydrates are broken down by the body into sugar as glucose; it is critical to athletic performance.
PROTEIN	Although it provides little energy to the body, protein is essential for building muscle and repairing damage that can occur during training.
FAT	Contrary to popular belief, dietary fat is essential to athletes. It provides a dense source of energy, contributes to essential fatty acids, allows fat-soluble vitamins (A, D, E & K) to be absorbed in the digestive tract and supports many physiological functions.
VITAMINS	Vitamins are organic compounds that allow the body to produce energy during exercise, while supporting a variety of other physiological functions.
MINERALS	Inorganic substances such as iron, calcium and sodium, that assist in the breakdown of food and support many body functions. Like vitamins, minerals are not produced by the body and must be consumed in the foods we eat.
WATER	Water makes up as much as 60% of total body weight. An adequate intake of water is critical in the function of many physiological systems. Dehydration will quickly impair performance.

FOOD IS FUEL

- Now that we have an understanding of what happens when we consume different foods, we can construct a daily meal plan. We are going to use as an example a scenario consisting of a morning and afternoon practice.
- We will use a 3 meals 3 snacks approach.
- Here is the pattern that we are going to follow:

High Glycemic Index liquids, shakes... during and immediately after the workout.

High-Medium Glycemic Index foods right after practice.

Lower Glycemic Index foods the further we get from the end of the workout.

NO JUNK FOOD.

- The plan provided it's easily modifiable according to the specific needs of each swimmer:
- Only have one afternoon practice that day? Cut out Snacks 1 and 2.
- Only have a morning practice? Skip Snack 3.
- If you have a day off, are in the off-season or in taper, get rid of all snacks.
- To some degree, we have to account for calories-in balancing with calories-out. More important however is eating good quality food that is good for you.

DAILY NUTRITION PLAN

Snack 1 *(Purpose: Refuelling liver and feeding the brain after an overnight fast).*

- 30'-60' Before the start of the training.
- Liquid snack of low to medium GI food consisting of complex carbs, some protein and caffeine (about 3:1 carb to protein ratio).
- Breakfast shake with some fruit: apple, orange, banana...

Morning Workout

- Sports drink (High GI) or coconut water... starting after warm up and throughout the workout.

Meal 1: Breakfast

- Balanced meal with Medium GI carbs, protein and fats.
- Eggs, oatmeal, granola, fruit, milk...
- No juices (too high GI), avoid doughnuts, pancakes, processed bread... (too much trans fat, not enough fibre).

Snack 2 *(Can be before or after meal 2, depending on when you will have lunch).*

- Low GI foods (about 3:1 carbohydrate to protein ratio).

- Almonds, avocado, nuts, seeds, dried fruit, another shake, cheese...

Meal 2: Lunch

- Balanced meal with Low GI carbs, protein & fats.
- Meat and veggies.

Afternoon Workout

- Sports drink (High GI) or coconut water... starting after warm up and throughout the workout (just like in the morning).
- Between exiting the pool and arriving home: dry raisins, dates, peanuts, cashews, banana...

Meal 3: Dinner

- Balanced meal with Medium GI carbs, protein & fats.
- Some pasta, beans, rice with associated meats and veggies. Fruits as pineapple, cherries...

Snack 3 *(Bedtime recovery, if some time has passed since dinner and the time you go to sleep).*

- Protein based snack with some very Low GI carbs.
- Protein shake, cheese...

RACE DAY PLAN

- The goal here is to race without feeling hungry or full. It's a tough balance because you could be at the pool six, eight... hours a day with races at any time.
- So, you have to keep your nutrition up without overfilling yourself at any one time during the day. **That's why snacks will be essential.** Here is the plan:
- Try to eat a meal 1-2 hours before getting on the blocks (*which might be only an hour or so before morning warmups*).
- Mostly low to medium GI carbs with some protein. Limit fat since it takes a long time to digest. (Try rice with an egg or two).
- Snack on salty low GI carbs to keep you thirsty and not hungry. Dried fruits, nuts, plain cooked pasta. Stay away from sugary sports drinks unless it is right after warmup or the longer events. (Everything else is too short a race to burn much sugar, so we don't have to worry much about refuelling at this point).
- Eat a big balanced meal as soon as possible after the session, this may be the only meal before the evening or finals.
- End the day with a balanced meal, with more emphasis on protein to rebuild muscle during the night.





PART 2

QUICK NOTES

(IF YOU WANT TO KNOW MORE)

QUICK NOTE ON FATS

- Fat is a good thing. It helps you get through tough workouts and is essential to absorbing certain fat-soluble vitamins.
- But not all fats are made the same, and some should be avoided. We can group the many varieties into three big categories that are easy to keep track of:
- Trans fats - Saturated fats - Mono/poly-unsaturated fats.

TRANS FATS	SATURATED FATS	MONO/POLY UNSATURATED FATS
<ul style="list-style-type: none"> • Trans fats are by far the worst, are mostly a synthetic and should be avoided 100% of the time. • Trans fats can be found in anything that is processed and lasts forever. 	<ul style="list-style-type: none"> • Saturated fats come from animal fats and are ok in moderation. • These can be found in meat, dairy, eggs... 	<ul style="list-style-type: none"> • Mono/poly-unsaturated fats are actually very good for you. • These fats mostly resemble what is found in the body and are used to construct cell membranes properly.
<p>Cake, frozen meals, fried food, candy bars, protein bars, chips...</p>	<p>These can be found in meat, dairy, eggs...</p>	<p>These fats are mainly plant and nut derived: olive oil, canola oil, avocados, fish and cashews...</p>
		

QUICK NOTE ON CARBOHYDRATES

- Carbohydrates are the most important fuel source to replace after a tough workout.
- Athletes need to increase their carbohydrate consumption compared to non-athletes.
- The base unit of any carb is a simple sugar, the most important to us is glucose which is the preferred fuel source for all cells in the body.
- The body can modify sugars that are absorbed to a certain degree to convert them all to glucose, the main sugar the body likes to use.

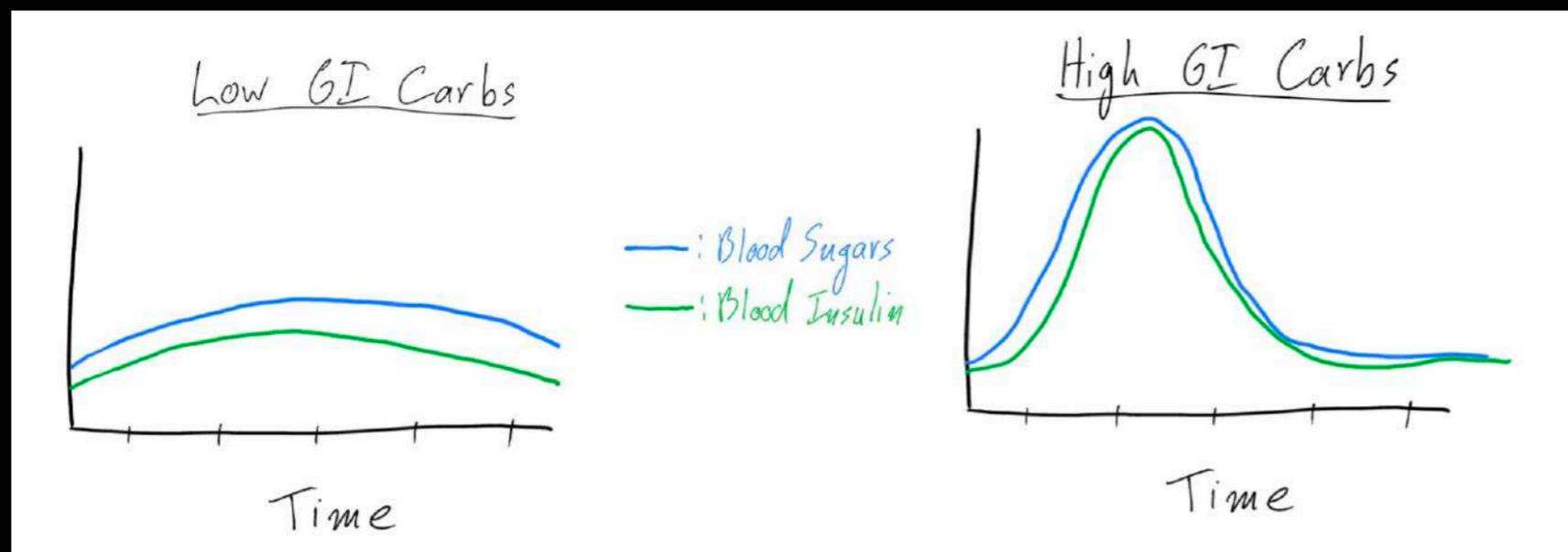
INSULIN AND GLYCEMIC INDEX

- After being eaten, carbohydrates are broken down into simple sugars, absorbed in the intestines, enter the blood and are then distributed throughout the body as simple sugars.
- BUT, the sugars in the blood are not allowed to be absorbed by muscles, fat cells and other organs just like that... They need a hormone called insulin that gives permission to the muscles to take sugar out of the blood and store it inside the cell as glycogen.
- This is due to a very selfish organ called the brain, that demands priority on sugar in the blood. The brain does not need insulin's permission to access blood sugar. Once the brain is satisfied, the muscles can start absorbing sugar.
- This is actually a good thing because if the brain doesn't get its sweet tooth fix it can stop functioning normally really quick and cause you to feel tired, pass-out, have seizures...

- The amount of insulin released in the blood is proportional to the amount of sugar that enters the blood.
- If you have a couple sports drinks full of simple sugars that are absorbed within minutes, then insulin has to dump into the blood all at once and the insulin levels spike in order to get the sugar inside muscles and fat cells quickly.
- If you have a complex carb meal of veggies and pasta, the absorption of sugar will slow down and insulin won't have to rise very high to maintain sugar levels at a reasonable level.

The speed and amount that blood sugar rises from different foods is called the **Glycemic Index (GI)** and it is a good estimate of how much insulin will rise as well.

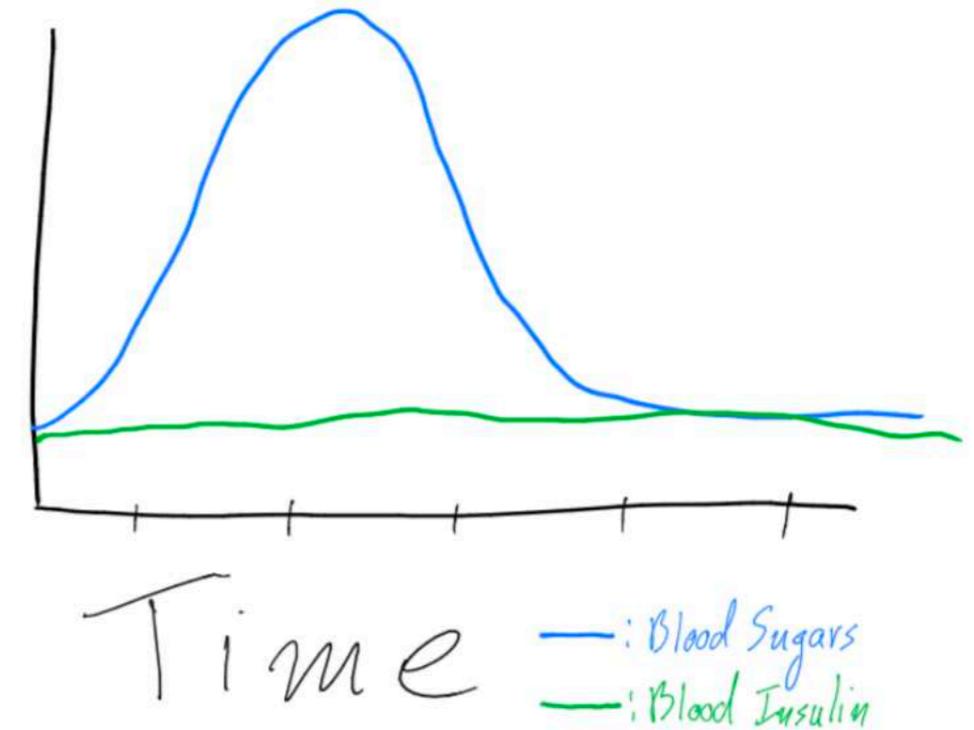
- The higher the glycemic index of a food, the faster sugar is absorbed and enters the body, and the higher insulin will go to bring the sugar levels back down by allowing muscles and fat to absorb the sugar.



THE WORKOUT LOOPHOLE

- Our goal is to maximise muscle's absorption of sugar without getting spikes in insulin.
- There is a loophole in the system that we can exploit: During and immediately after workout, muscles DO NOT need insulin to absorb sugar from the blood.
- The theory is that a workout is kind of like being in a fight for your life (and if it's a butterfly set, it really is...). The body wants to win that fight no matter what, so it allows muscles to take the sugar they need without insulin's permission so they can keep their engines running at maximum...
- That means if you drink sports drinks during the workout, or consume some dates, dry fruits... within 30 minutes of finishing the workout, your muscles will absorb all that sugar without a lot of insulin needing to be released. That means no sugar is sent to fat cells.
- We are going to take advantage of this loophole to jump start our recovery the second we are out of the water and make sure our muscles are fuelled up and ready to go for next workout.
- As we get farther from workout, we will focus our nutrition on lower glycemic index foods to keep insulin at a reasonable level and supply muscles with a steady stream of sugar to refuel them over a longer time.

High GI Carbs
in Workout





QUICK NOTE ON HYDRATION

- Working out hard, even in a pool, you can lose up to two litres per hour of water through sweat (more so if you are training in a pool with hot water!).
- Exercise raises body temperature (yes, even in the pool...). Sweating offers an efficient way to remove excess heat from the body.
- Any sweat loss from the body also removes electrolytes such as sodium and potassium from the body.
- Electrolytes must be present in proper concentrations to maintain fluid balance, muscle contraction, and neural activity—all essential to high performance and basic daily functions.
- As little as a 1-2% decrease in body weight due to dehydration is enough to cause a measurable decrease in performance.
- If your blood volume is low from dehydration, your heart has to pump harder and faster to maintain its output which increases how hard you think the workout is.



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