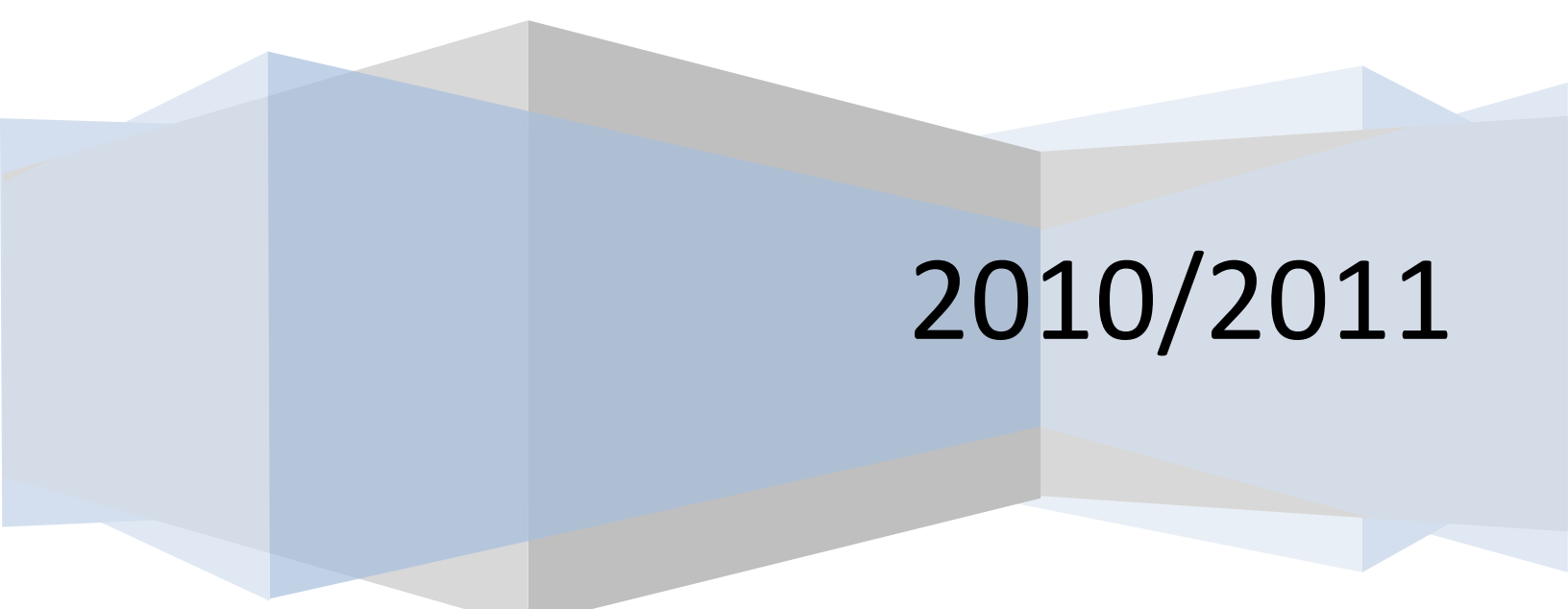


Rivanna Rowing Club

Off Season Training Program

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Nutrition

Any serious training program starts with eating properly. If you fail to provide your body with the proper nutrients, it will fail during your training and you will not see results. There are thousands of books written on athlete nutrition, so I will not attempt to do that here (if you are interested, ask at any book store). However, I will try to hit the high points.

Hydration

Drink water. Drink a lot of water. Drink it all of the time. Do not train if you are dehydrated.

There are many reasons why this is important. I will not list them all here. However, I will describe one of the most important. Your heart supplies oxygen to your muscles by pumping blood. The harder you work the more oxygen your muscles need to function and the harder your heart has to work. The rate at which your heart can get oxygen to your muscles is a function of how much blood your heart can move per beat (heart strength) and the rate at which your heart pumps (your heart rate). The only way to improve the power of each pump is to work out for long periods of time focusing on improving the strength of your heart; this will not change during a single workout. Therefore, your heart will resort to increasing your heart rate as you train at higher and higher intensities. But, there is a limit to our maximum heart rate (discussed later). This begs the question, is there a way to work harder considering we are limited by heart power and heart rate. In fact, there is: blood volume. The more blood we have, the more effective each pump of the heart is (part of the reason blood doping improves performance). So how can we increase blood volume? Drink water. Just by staying hydrated, you can work harder and increase your maximum performance.

How much should I drink?

1.5 liters, or a little over 50 ounces, is the minimum a person (of average size and weight) needs to operate during the day. This is far less than what is needed for someone who exercises even a little.

I have a 32 ounce Gatorade bottle that I use throughout the day. In the morning, I fill and drink two bottles about 30 minutes before a workout. That seems like a lot, but the body loses a good deal of water when we sleep. Throughout the workout, I drink one bottle. After the workout I drink another 32 ounce bottle along with 20+ ounces of Gatorade and a recovery shake. During the day, I will drink about 3-6 more 32 ounce bottles worth of water.

This may seem like a lot, but I am a 225lbs person. Obviously, if you are smaller or work out less, you will not need to consume as much water.

As a general rule of thumb, you should *never* feel thirsty. If you are thirsty, you are already slightly dehydrated. Additionally, the body absorbs water more efficiently if consumed in large quantities all at once. For example, it is better to drink a 32ounce bottle in 2 minutes than it is to ration the 32 ounces over the course of an hour or two.

If you don't drink this much already, it is a royal pain the ass to start. Your body will not be used to processing this much water and you should expect to need to use the restroom constantly. This is expected, but after a few weeks, your body will be more accustomed to the water and will return to a normal frequency.

What about “Water Poisoning?”

Water poisoning occurs when the electrolytes in the body are driven to unsafe levels by either the over-consumption of water or long periods of intense exercise without properly replacing electrolyte. It has been in the news a few times over the last few years, so I figured I would mention it here. The average athlete does not need to worry about this occurring. Typical cases occur from water drinking competitions or when athletes diet and fail to replace essential nutrients. As long as you have healthy pre- and post-workout meals, this should not be a problem.

Drinking the appropriate amount of water is an easy way to perform harder for longer and feel more energetic during the day.

Pre-Workout Nutrition

It is very important to eat a little bit before each workout. First, it boosts your metabolism and increases your body's tendency to burn fat instead of muscle during a workout. Second, it provides a boost of energy so that you can do more work during the workout.

Pre-workout snacks are very simple. Basically any small amount of easy to digest food is what you are looking for. Simple carbohydrates and sugars should be a large part of this meal. What you want to avoid is anything hard to digest, like whole grain breads, as the energy from these foods may not get to your blood stream by the time you start your workout. I like to eat a PB&J sandwich on white bread 30 minutes prior to starting. When I am in a rush, I take 2 tablespoons of honey. At the very least, keep small bags of jelly beans in your car and eat one before your workout. Also consider a turkey sandwich, trail mix, fruit, or even a candy bar.

Post-Workout Nutrition

For athletes, the most important meal of the day is the one immediately following your workout. During exercise, the muscles in our bodies break down. After our workout, our muscles start to rebuild stronger than they were before. However, this can only take place if we provide our bodies with the necessary nutrients to rebuild the muscles.

In general, you have about a 30 minute window from your last hard stroke to get the right food into your body. If you fail to do so, your body will start to consume itself to repair the damage done to your muscles. This leads to losses in fitness, general fatigue for the rest of the day, and increased appetite (leading to larger, healthier meals later in the day).

If you do eat properly after a workout, your body will start to repair the damage without doing damage to itself. You will feel more energetic throughout the day. The energy from the meal will be more efficiently utilized by the body, increasing the gains per calorie consumed. Finally, you won't be overly hungry for your next meal and will feel satisfied with a smaller portion. The sooner you can get the food into your body, the more pronounced these advantages are.

What should I Eat?

The best thing to eat is a properly balanced meal that is easily digestible. This can be difficult to do with solid foods, especially if you workout at the boathouse. Clif Bars and similar 'power bars' are a good option but often are not very well balanced. Muscle Milk and other post-workout shakes are designed just for this purpose, but are very expensive and taste pretty bad. Perhaps your best option (and what I do) is to make a smoothie prior to practice and put it in a cooler/refrigerator for consumption immediately after the workout.

Post Workout Smoothie

When deciding what to put into your smoothie, remember that it should be a balanced meal. It should have protein to repair muscle, carbohydrates to provide energy, vitamins and minerals, and electrolytes to replace those lost during the workout. Below are the ingredients I put into my post-workout smoothie:

- 1) A serving of pure whey protein supplement – to supplement muscle recovery, flavor
- 2) Honey – simple carbohydrates for immediate energy, flavor
- 3) Instant oatmeal – complex carbohydrates
- 4) Frozen fruit (strawberries or blue berries are what I like) – carbs and nutrients, flavor
- 5) V8 vegetable juice – good vitamins and minerals
- 6) Pine apple juice – good for you, adds flavor
- 7) Lemon juice – for flavor

However, you can add any other ingredients that you want. I just eyeball the proportions of these ingredients to get the flavor that I like; it will take some trial runs.

In addition to the smoothie, I take my daily multi-vitamin.

Overtraining

Overtraining Syndrome, or OTS, is a condition that occurs when the damage done by exercise exceeds the body's ability to recover. It can happen because of any combination of malnutrition, under-hydration, or too high of a training volume. It is characterized by the following symptoms:

- * Persistent muscle soreness (Delayed onset muscle soreness)
- * Persistent fatigue
- * Elevated resting heart rate
- * Reduced heart rate variability
- * Increased susceptibility to infections
- * Increased incidence of injuries
- * Irritability
- * Depression
- * Mental breakdown

If you experience any of these symptoms during your exercise routine, think about what might be the problem. Am I drinking enough water before and after practice? Am I eating well? Am I simply training too hard?

You should seek the opinion of a medical professional if these symptoms persist.

Training Intensities

To maximize the effectiveness of any workout routine, workouts are done at a variety of intensities and durations. In this program, there are 6 primary training intensities. Each one is defined based on a percentage of your maximum target heart rate, a split based on a 1k erg score, and on how long you should train at that intensity.

Category	% of Max Heart Rate	1k split + x-seconds	Duration per Day
Compensation	< 75%	<23	No limit
UT2	76 – 80%	20 – 22	3 hours
UT1	81 – 85%	16 – 19	1.5 hours
AT2	86 – 93%	7 – 15	30' – 45'
AT1	94 – 98%	4 – 7	30'
Race Pace	100%	-2 – 3	20'

A majority of the workouts in the program will be between UT2 and UT1 in the hopes of developing a strong aerobic base. For a better explanation:

<http://www.humankinetics.com/excerpts/excerpts/developing-an-aerobic-base-for-rowing> .

As you train, you will get a better feel for each of these intensities. At some point, it won't be necessary for you to constantly check your heart rate; you can just feel what level you are training at.

These values will vary from person to person.

Initial Testing Period

Before we start to train, it is important to determine our current level of fitness. There are two primary benchmarks and tests we will use to determine this—1k time trials on the erg and heart rate monitoring. Both of these are effective means of finding individual training intensities and are critical to building your individual workout regimen.

The 1k Erg Test

The 1k all out erg test is used as the base split for most of the erg workouts in this program. For example, for a UT2 workout you should be at “1k split + 22-sec.” This means that, if your average 1k split is 1:40, you should be erging at a 2:02 split for the UT2 workout. If these splits seem difficult to hold for the entire workout, you should consider focusing on your cardio base. If these splits are too easy, go a little harder but not too much. Rowing doesn’t always have to be painful and it is very important to avoid over-training.

The 1k test should be a full-out effort. Performing perfectly for your fitness level is essential to get the most out of this training program. Therefore, properly preparing for the test is very important. Use the following guidelines to prepare.

- Get plenty of sleep the night before the test. Hydrate well and eat well for the week prior to the test.
- Do not take the test groggy. Wake up at least an hour before you plan to take the test. Obviously, this is only an issue if you work out in the mornings or take a lot of mid-day naps.
- Find the proper drag factor. Somewhere between 90 and 140 is appropriate. I test at 110 (probably a little lower than I should be)
- Warm up properly before the test. 5-min light paddle, 5-min stretch, 3-min steady state, 2-min stretch, 3 x 10 strokes at pace, 2-min active rest, then test
- Do not fly-and-die. It is better to row the first 500m slow, and pick it up in the end than it is to go out too hard and die before the end.
- Take the time at the end of the test to properly cool-down.

If you can, wear a heart rate monitor during the test. This will give you a very accurate measurement of your maximum heart rate.

For the younger and more fit, try at 2k test instead of a 1k test.

While the 1k split time is an effective way to gauge a workout, it does have its limitations. For example, the split times only correlate to your split on a concept2 erg. Hopefully, most of your training will be on the water, so there is little to no feedback on your rowing intensity.

Heart Rate Monitoring

Because not all of your workouts will be done on the erg, it can be difficult to tell how hard you are pushing yourself. Perhaps one of the best forms of feedback you can get when you are rowing is your heart rate. Conveniently, your heart rate correlates very well with how hard you are pushing yourself.

There are a few ways to determine your heart rate, some more accurate than others. We will discuss the three easiest along with their advantages and disadvantages.

Heart Beat Counting

First, find your pulse in your neck or wrist. Using a watch, time 15 seconds and count the number of heart beats you feel. Multiply this number by 4 to get your heart rate. This is the simplest form and is fairly accurate. All that is required is for you to have a way to count 15 seconds. However, there is one major disadvantage; you cannot check your heart rate during a piece, only after you have finished. Consequently, you cannot adjust your intensity mid-piece to hit the target heart rates.

Sing Test

This is a much less accurate way to track your heart rate but it does allow you to check your heart rate mid piece. Try to sing during your piece, if you can then your heart rate is below UT2. If you can comfortably talk but cannot sing, you are around a UT2 pace. If you are struggling to talk, you are around UT1/AT2. If you cannot talk, you are at AT2/AT1. Again, this is much less accurate than counting heart beats, but it allows you to check yourself mid piece.

Heart Rate Monitor

The most effective way to determine your heart rate is to invest in a heart rate monitor. The system includes a chest strap and a watch and provides constant feedback based on your output. Furthermore, it allows you to time your pieces, track average/max/min heart rates for any given piece, and give audio feedback based on your current heart rate. The only downside to this method is the cost of the monitor. They can range anywhere between \$40 and \$200. At the very least, you should find one with a digital transmitter to avoid cross-talk between receivers.

Determining your Maximum Heart Rate

Now that you have an effective way to measure your heart rate, you must determine your maximum heart rate. Each of the workouts is defined partly by what percentage of your maximum heart rate you should be working at. There are two ways effective ways to find your maximum heart rate.

The first is to simply take 220 and subtract your age. For example, if you are 50 years old, your maximum heart rate is about 170.

The second way to find your maximum heart rate is to use a heart rate monitor to record a 1k or 2k all-out erg test. If you are pulling your hardest for a 1k test, you will max out your heart rate. It should be close to the method described before. This method is more accurate than the

Now that we know our max heart rate, we can use this to determine how hard to push during a piece. For example, after my 1k test, I found my max heart rate to be 180 bpm [beats per minute]. The next day, I am planning to do a 10k at UT2 at about 80% of my max heart rate. During the 10k, I try my best to hold my heart rate at 144 bpm (80% of 180) *regardless* of the split during the piece. Ideally, heart rate percentages for an erg piece will correlate closely with the 1k+time measure of the erg piece. However, especially if we are out of shape, the splits for a given heart rate may not correspond to the ideal split times from our 1k tests.

It is more beneficial to base workouts based on max heart rate than it is to base workouts on the 1k test results.

Sample Training Month

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Week 1 – Light						
Row/erg at UT2	10k erg at UT2 + Body Circuit	Row/erg at UT1	Cross-train at UT2 + Body Circuit	Row/erg at UT1	Row/erg at UT2	Off / UT 2
Week 2 – Harder						
Row/erg at UT2	10k erg at UT2 + Body Circuit	Row/erg at UT1	10 erg at UT2 + Power Erg	Row/erg at UT1	Row/erg at AT2	Off / UT 2
Week 3 – Hardest						
Row/erg at UT1 + Body Circuit	10k erg at UT2 + Power Erg	Row/erg at AT2	10k erg at UT2 + Power Erg	Row/erg at UT1	Row/erg at AT1 / Race	Off / UT 2
Week 4 – Recovery						
Row/erg at UT2	Cross-train at UT2	Row/erg at UT2 / Body Circuit	Cross-train at UT2	Row/erg at UT2	Row/erg at UT2	Off

Here are some sample workouts to give you some idea of what you should be training at. However, any workout at the appropriate heart rates will suffice.

- UT2:** heart rate no higher than 80% of max / 1k split + 22 seconds
- Any workout, approximately 100 minutes at 80% of max heart rate, or your 1k split + 22 seconds.
- UT1:** heart rate no higher than 85% of max / 1k split + 17 seconds
- 3 x 19-min pyramids (4-3-2-1-2-3-4) @ SR 18, 20, 22, 24; 5-min rest between
 - 5 x 10-min (4-3-2-1) @ SR 18, 20, 22, 24; 30-sec off in between
 - 8 x 6-min (2-2-2) @ SR 18, 22, 26; 1-min off in between
- AT2:** heart rate no higher than 93% of max / 1k split + 10 seconds
- 6 x 5-min @ SR 26; 2-min off between
 - 3 x 10-min @ SR 26; 5-min off in between
 - 3 x [10 x 40-sec on / 20-sec off] @ SR 28; 5-min off between
- AT1:** heart rate no higher than 98% of max / 1k split + 4 seconds
- 3 x 1k all out; 7-min rest between
 - 6 x 500m all out; 500m paddle between
 - Any competitive race piece @ SR 26+ all out
 - 1k test on erg
- Cross-train:** Any cardio workout other than rowing. This helps guard against over-training and injury. Consider the following activities:
- Cycling/spinning
 - Running
 - Hiking/trail running
 - Swimming

- Cross-country skiing

Body Circuit: 3 x (1-min on / 15-sec) off maxing out the following exercises

- Jumpies
- Post-pulls / inverted rows
- Pushups
- Wall-sit
- Sit-ups

NOTE: The important thing is to max out your body during each 1-min session. It is not expected to be able to do pull-ups for a whole minute, but to see improvement as the year progresses. Do not pace yourself—max out during every circuit. Otherwise, you are cheating yourself.

Power Erg: You can supplement this workout with the Body Circuit

- 6 x (2-min on / 1-min off) @ SR 16, MAX pressure every stroke; Erg damper set to 10

NOTE: The form during this workout MUST be perfect. There is too much chance for injury otherwise.

Modifying to Suit Your Needs

Now that we have all of the major components of an effective training program, it is time to tailor this to suite your own fitness, schedule, and desired results.

The four week cycle outlined above is probably the hardest anyone in this program should work. Following it should show huge improvements during the off season. However, it is very time consuming and training intensive and may result in overtraining if you are not used to these types of volumes of work.

At the very least, you should be working out three times a week at UT2/UT1. Something similar to M, W, F of week 1 of the outlined cycle will be enough to maintain your current fitness through the off season.

When deciding how to modify this cycle, consider the following points:

- UT2 and UT1 are the most important intensities for a rower to train at.
- Body circuits can be substituted for power-erg workouts if you are looking for a lighter schedule
- If you are going to work out 3 or 4 times a week, try to spread out the workouts instead of clumping them together and taking 3-4 days off in a row
- Cross training can be very beneficial and a relief from the monotony of erging day in and day out.

Once you have decided on a schedule to follow, stick to it. Often it can any excuse at all to convince yourself it is okay to skip a workout. Do not allow this to happen. Stick to your schedule and you will feel better about it later. Do not lie to yourself. If you can find someone to workout with consistently, do it. Workouts with someone else are much more enjoyable and you can hold each other to the schedule.

Finally, try to keep a workout log. Write down what you want to accomplish each day and what you actually did. Record your splits and heart rates for each workout. As the months go by, you can see how you are improving.