

Welcome to the first edition of the **Coach Robb/Concept 2** eBook! It is my goal to provide you with cutting edge information for sensible and effective training. Through all of the client resources available to you, I hope to eliminate the confusion and complexities surrounding human performance and provide you with tools that will make you more efficient and smarter by the end of next week! It is no secret that I strongly believe in the effectiveness of the Concept 2 rower and recommends that all of our clients own or train on a Concept 2 unit; however, please understand that I don't receive financial compensation or free Concept 2 units. I just wanted to provide you, the dedicated client, some cross training protocols to maximize your training efforts using the Concept 2 rower.

If at any time you have a specific question, feel free to email me at robb3@earthlink.net and I will answer your question personally.

How will these Concept 2 workouts make you a faster and stronger athlete?

By implementing the following workout protocols, you will **minimize and/or eliminate**:

- Muscular fatigue
- Body fat (by burning unwanted fat and building lean muscle tissue)
- Injuries due to lack of flexibility
- Inconsistent results due to not training the appropriate energy systems to handle new levels of speed (both mentally and physically)

Throughout this and all of my eBooks, I will help you eliminate these and other common oversights in your training program, to help you achieve better overall health and race results.

I hope you enjoy the format and content of this eBook. Please don't hesitate to send me your feedback on how you are able to apply this information into your weekly training regimen. As you achieve your desired race results, please share this information with me – I would enjoy sharing your success in our upcoming newsletters.

Remember, **TRAIN SMART – NOT HARD!**

Yours in sport,

Robb Beams, Staff & Coaches

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The information contained in this eBook is from the author’s experiences and is not intended to replace medical advice. It is not the intent of the author to diagnose or prescribe. Before beginning any program you should consult with your physician and address any questions to your physician.

SETTING UP YOUR TRAINING SCHEDULE

To optimize the effectiveness of these training protocols, take out your weekly calendar/personal schedule and determine the amount of time you have to complete the following training protocols (be realistic and remember to include the time it takes for you to drive to and from your workouts):

- A. Sport specific training (top priority)
- B. Cross training/cardiovascular fitness (Concept 2 rowing, elliptical, aqua jogging, etc.)
- C. Strength training
- D. Flexibility
- E. Food purchasing and preparation
- F. Time to sit down and eat
- G. Sleep (8-9 hours ideally)

There are other important variables to consider (i.e. work and family); however, in regards to this eBook, we are only addressing the time necessary to train specific to your sport. Once you have the time blocked out on your calendar for work and family, you can begin to plug in your workouts.

The **first variable** to plug in is sleep and eating schedule (everything you do needs to be geared around these days). Though this sounds odd, nutrition and sleep are the instrumental variables that will take your fitness (and speed) to new levels – **FAST!** Think about it this way, food provides the building blocks to a stronger and more resilient body. Through your food you will pick up the necessary amino acids to repair and build new muscle, carbohydrates to fuel your workouts and fat to maintain the integrity of your cells and other hormone related functions. Sleep is where your body catapults to the next level due to the release of human growth hormones (naturally) along with providing your body a chance to absorb the quality of your workouts. Remember, going hard every day will NOT make you fast – ironically, it will just make you chronically tired and ultimately slow. After the sleeping and eating, plug in your sport specific training (**second variable**). After the variables of, food and rest, you can plug in the remaining cross training/performance elements (**third variable**) around your availability of time based on your personal schedule.

Follow the spreadsheets below to plug in your aerobic, power and recovery Concept 2 workouts. Please don't surpass the number of workouts per week – especially in regards to your race power workouts. If you push too hard, too often, you will wear yourself down quickly. Ideally allow two (2) days in between race specific workouts so your body can absorb the demands of high intensity riding and racing. Pay attention to your body's signs that you are getting tired: high heart rate, rapid body weight loss along with your moods. If you are struggling to get motivated to workout, you are not absorbing the workouts – either back off of the intensity or add an additional day of rest. If your body is not absorbing, adapting and strengthening, you are not moving your overall health (and ultimately your on track speed) forward: remember, **TRAIN SMART, NOT HARD!**

SETTING UP YOUR TRAINING SCHEDULE CONTINUED

Concept 2			
Week 1	Workouts	Frequency Per Week	Misc. Notes
	Concept 2 - Aerobic Workouts Concept 2- Power Specific Workouts Weights	3x 2x 3x	Keep the intensity within range to reap the full benefits Pre workout calories are imperative due to intensity Specific to your race and peaking schedule
Week 2	Workouts	Frequency Per Week	Misc. Notes
	CONCEPT 2 - Aerobic Workouts CONCEPT 2 - Power Specific Workouts Weights	3x 3x 3x	These become an active recovery workout Hold yourself accountable Specific to your race and peaking schedule
Week 3	Workouts	Frequency Per Week	Misc. Notes
	CONCEPT 2 - Aerobic Workouts CONCEPT 2 - Power Specific Workouts Weights	3x 3x 3x	Don't let the intensity get too high here If possible, try to duplicate where you did earlier Specific to your race and peaking schedule
Week 4	Workouts	Frequency Per Week	Misc. Notes
	CONCEPT 2 - Aerobic Workouts CONCEPT 2 - Power Specific Workouts Weights	5x 0x 3x	Keep the intensity levels low to allow for full recovery No workouts from this file this week Decrease your weight used by 20%

REPEAT THIS FOUR WEEK CYCLE THROUGHOUT THE YEAR ACCORDING TO YOUR RACE/PEAK SCHEDULE

Coach Robb's Aerobic Row Workout #1		Workout Focus: Aerobic Enhancement	
	Description	Intensity	
Warm Up-5 Minutes		Focus: Gradual Warm Up	
Damper Setting Elapsed Time	Damper lever: 0-2 5 Minutes - even pull / stroke count less than 25 (very easy) Stop and stretch if you feel any tight muscles	40%	
Main Set #1-10 Minutes		Focus: Muscular Endurance	
Damper Setting Set Notes	Damper lever: 0-2 focus on your breathing as you bring the bars back to the starting position; lead with legs		
Work Interval Rest Interval	5 minutes of continuous pulling with a stroke count between 25-30 (no higher or lower) 5 minutes of continuous pulling with a stroke count below 25 (no higher) Stop and stretch if you feel any tight muscles	75% 50%	
Main Set #2-20 Minutes		Focus: Intensive Endurance	
Damper Setting Set Notes	Damper lever: 2-4 stay mentally focused on a straight back to avoid pulling your lower back		
Work Interval Rest Interval	1 minute of powerful leg push back / pull bar straight towards chest (stroke rate above 30) 1 minute of easy pulling (stroke rate less than 25); hydrate as necessary REPEAT THE 1 ON/OFF CYCLE A TOTAL OF 10 TIMES FOR 20 MINUTES TOTAL Stop and stretch if you feel any tight muscles	85% 50%	
Main Set #3-10 Minutes		Focus: Muscular Endurance	
Damper Setting Set Notes	Damper lever: 2-4 focus on your breathing as you bring the bars back to the starting position; lead with legs		
Work Interval Rest Interval	5 minutes of continuous pulling with a stroke count between 25-30 (no higher or lower) 5 minutes of continuous pulling with a stroke count below 25 (no higher) Stop and stretch if you feel any tight muscles Rest For 10 Minutes - Stretch from head to toe / Re-hydrate with HEED	75% 50%	
Warm Down-5 minutes		Very easy pulling - keep the stroke rate less than 25 for entire duration	
		Beginning Weight:	Ending Weight: Loss Gain (Loss):
Post Workout: stretch passively from head to toe; put extra attention on your overly tight areas. This will avoid future injury sites from developing. Eat a complete meal within 20 minutes of completing this workout. Please don't underestimate the power of a proper recovery meal. You will feel the results in your future workouts.			

****For information on technique and damper setting please visit www.concept2.com**

Workout Notes: This workout will begin to catch up with you by set #3 if completed patiently. If you get aggressive too early, you will struggle to finish up Set #3 and lose the aerobic benefits. Don't forget to capture your weight pre and post workout - this will provide insight into your perspiration rate with the rower.

Coach Robb's Aerobic Row Workout #2		Workout Focus: Aerobic Enhancement	
		Description	
Warm Up-5 Minutes		Focus: Gradual Warm Up	
Damper Setting	Damper lever: 0-2		
Elapsed Time	5 Minutes - even pull / stroke count less than 25 (very easy)		
		Stop and stretch if you feel any tight muscles	
Main Set #1-15 Minutes		Focus: Muscular Endurance Pyramid	
Damper Setting	Damper lever: 3-5		
Set Notes	focus on your breathing as you bring the bars back to the starting position; lead with legs		
	NOTE: ON EQUALS A STROKE RATE OF 30 PLUS / OFF EQUALS A STROKE RATE OF LESS THAN 25		
Work Interval	30 SECONDS ON / 90 SECONDS OFF = 2 MINUTES 40 SECONDS ON / 80 SECONDS OFF = 2 MINUTES 50 SECONDS ON / 70 SECONDS OFF = 2 MINUTES 1 MINUTE ON / 1 MINUTE OFF = 2 MINUTES 1 MINUTE ON / 1 MINUTE OFF = 2 MINUTES		
Rest Interval	5 minutes of continuous pulling with a stroke count below 25 (no higher)		
		Stop and stretch if you feel any tight muscles	
Main Set #2-15 Minutes		Focus: Muscular Endurance Pyramid	
Damper Setting	Damper lever: 3-5		
Set Notes	focus on your breathing as you bring the bars back to the starting position; lead with legs		
	NOTE: ON EQUALS A STROKE RATE OF 30 PLUS / OFF EQUALS A STROKE RATE OF LESS THAN 25		
Work Interval	30 SECONDS ON / 90 SECONDS OFF = 2 MINUTES 40 SECONDS ON / 80 SECONDS OFF = 2 MINUTES 50 SECONDS ON / 70 SECONDS OFF = 2 MINUTES 1 MINUTE ON / 1 MINUTE OFF = 2 MINUTES 1 MINUTE ON / 1 MINUTE OFF = 2 MINUTES		
Rest Interval	5 minutes of continuous pulling with a stroke count below 25 (no higher)		
Warm Down-5 minutes		Very easy pulling - keep the stroke rate less than 25 for entire duration	
		Beginning Weight:	Ending Weight: Loss Gain (Loss):

****For information on technique and damper setting please visit www.concept2.com**

Workout Notes: by the end of this workout you want to feel very powerful and in control. Notice that the "on" interval is not a sprint, simply a controlled pull. Belly breathing while coming back to the starting point will maximize the amount of oxygen present within the blood and avoid an anaerobic environment. As you pull back, feel for the power being generated in your legs, gluts and your back muscles - the difficult part of these muscles is that they consume a great deal of oxygen, so belly breathing will make the workout more productive and comfortable for you. Don't blow off your rehydration during the rest intervals - important to maintain your blood sugar levels.

Coach Robb's Aerobic Row Workout #3		
Workout Focus: Aerobic Enhancement		
	Description	Intensity
Warm Up-5 Minutes		
Focus: Gradual Warm Up		
Damper Setting	Damper lever: 0-2	
Elapsed Time	5 Minutes - even pull / stroke count less than 25 (very easy)	40%
Elapsed Time	5 Minutes - 20 seconds on (30 strokes or more) / 40 seconds off (25 or less strokes)	40%
Stop and stretch if you feel any tight muscles		
Main Set #1-500 Meter Assessment		
Focus: Muscular Endurance Assessment		
Damper Setting	Damper lever: 0-2	
Display Setting	Distance	
Set Notes	Stay in control even though you will putting out a high effort of pulling with arms/pushing with legs	
Work Interval	500 Meters for time (85% Effort) - Strokes per minute above 30	85%
Elapsed Time		
Rest Interval	5 minutes of continuous pulling with a stroke count below 25 (no higher)	50%
Stop and stretch if you feel any tight muscles		
Main Set #2-1000 Meters		
Focus: Muscular Endurance Pyramid		
Damper Setting	Damper lever: 3-5	
Display Setting	Distance	
Set Notes	Don't go out too hard; consistency is the goal of this interval set	
Work Interval	1000 Meters for time (85% Effort) - Your goal is 2x your 500 meter time from Set #1	85%
Stroke Rate	30 plus for entire 1000 meters	
Elapsed Time		
Rest Interval	5 minutes of continuous pulling with a stroke count below 25 (no higher)	50%
Main Set #3-500 Meters		
Focus: Muscular Endurance		
Damper Setting	Damper lever: 3-5	
Display Setting	Distance	
Set Notes	Stay in control even though you will putting out a high effort of pulling with arms/pushing with legs	
Work Interval	500 Meters for time (85% Effort) - Strokes per minute above 30	85%
Elapsed Time		
Rest Interval	5 minutes of continuous pulling with a stroke count below 25 (no higher)	50%
Stop and stretch if you feel any tight muscles		
Main Set #4-1000 Meters		
Focus: Muscular Endurance		
Damper Setting	Damper lever: 3-5	
Display Setting	Distance	
Set Notes	Strive to match Interval #2 pace or slightly faster	
Work Interval	1000 Meters for time (85% Effort) - Your goal is 2x your 500 meter time from Set #3	85%
Stroke Rate	30 plus for entire 1000 meters	
Elapsed Time		
Warm Down-5 minutes		
Very easy pulling - keep the stroke rate less than 25 for entire duration		40%
Beginning Weight: Ending Weight: Loss Gain		
(Loss):		

****For information on technique and damper setting please visit www.concept2.com**

Workout Notes: This aerobic enhancement workout is going to push you both mentally and physically! You need to be specific with your pacing to optimize the effects of this double setting pace. If you are ten to fifteen seconds faster on

your 1000 meter intervals, then you are pushing too hard - simply back off the effort of pushing with your legs. You're goal is to stay consistent from set to set – teach yourself to hold a consistent pace (it will yield long benefits on the track!). Stay relaxed and keep your back nice and straight up to avoid pulling your back.

Coach Robb's Aerobic Row Workout #4		
Workout Focus: Aerobic Enhancement		
	Description	Intensity
Warm Up-500 Meters		
Focus: Gradual Warm Up		
Damper Setting	Damper lever: 0-2	40%
Elapsed Time	5 Minutes - even pull / stroke count less than 25 (very easy) Stop and stretch if you feel any tight muscles	
Main Set #1-500 Meter Assessment		
Focus: Muscular Endurance Assessment		
Damper Setting	Damper lever: 2-4	85%
Display Setting	Distance	
Set Notes	Stay in control even though you will putting out a high effort of pulling with arms/pushing with legs	
Work Interval	500 Meters for time (85% Effort) - Strokes per minute above 30	
Elapsed Time		
Rest Interval	5 minutes of continuous pulling with a stroke count below 25 (no higher) Stop and stretch if you feel any tight muscles	50%
Main Set #2-500 Meters		
Focus: Muscular Endurance Pyramid		
Damper Setting	Damper lever: 5-6	85%
Display Setting	Distance	
Set Notes	With the workload being increased slightly, don't over pull early and run out of energy	
Work Interval	500 Meters at 85% Effort - Your goal is to be within 2 seconds (faster or slower than Interval #1)	
Stroke Rate	30 plus for entire 1000 meters	
Elapsed Time		
Rest Interval	5 minutes of continuous pulling with a stroke count below 25 (no higher)	50%
Main Set #3-500 Meters		
Focus: Muscular Endurance		
Damper Setting	Damper lever: 6-7	85%
Display Setting	Distance	
Set Notes	With the workload being increased slightly, don't over pull early and run out of energy	
Work Interval	500 Meters at 85% Effort - Your goal is to be within 2 seconds (faster or slower than Interval #1)	
Stroke Rate	30 plus for entire 1000 meters	
Elapsed Time		
Rest Interval	5 minutes of continuous pulling with a stroke count below 25 (no higher)	50%
Main Set #4-500 Meters		
Focus: Muscular Endurance		
Damper Setting	Damper lever: 7-8	85%
Display Setting	Distance	
Set Notes	With the workload being increased slightly, don't over pull early and run out of energy	
Work Interval	500 Meters at 85% Effort - Your goal is to be within 2 seconds (faster or slower than Interval #1)	
Stroke Rate	30 plus for entire 1000 meters	
Elapsed Time		
Rest Interval	5 minutes of continuous pulling with a stroke count below 25 (no higher)	50%
Warm Down-500 Meters		
Very easy pulling - keep the stroke rate less than 25 for entire duration		40%
Beginning Weight: _____ Ending Weight: _____		Loss Gain
(Loss): _____		

****For information on technique and damper setting please visit www.concept2.com**

Workout Notes: This pacing set will challenge your ability to adjust your power output for consistency purposes - we are looking for a deviation of less than 2 seconds (either faster or slower) throughout the entire workout. Don't let the short 500 meter distance pull you into going too hard (especially early in the set). Focus on good form - little to no chain slap, straight back, leading with your legs and deep belly breathing. Stop and stretch if you feel any particular muscle group tightening up during this workout - plan ahead and be aware!

Coach Robb's Aerobic Row Workout #5		Workout Focus: Aerobic Enhancement	
		Description	
Warm Up-5 Minutes		Focus: Gradual Warm Up	
Damper Setting	Damper lever: 2-3		
Elapsed Time	5 Minutes - even pull / stroke count less than 25 (very easy)		
		Stop and stretch if you feel any tight muscles	
Main Set #1-10 Minutes		Focus: Muscular Endurance	
Damper Setting	Damper lever: 3-5		
Set Notes	Focus on your breathing as you bring the bars back to the starting position; lead with legs		
Display Setting	Time		
Work Interval	1 Minute on / 1 minute off		
		NOTE: ON EQUALS A STROKE RATE OF 30 PLUS / OFF EQUALS A STROKE RATE OF LESS THAN 25	
		REPEAT THE 2 MINUTE BLOCK 5 TIMES FOR A TOTAL OF 10 MINUTES	
Transition - 5 Minutes		Focus: Bring the Heart Rate Down & Get Mentally Prepared for Next Set	
Damper Setting	Damper lever: 2-3		
Elapsed Time	5 Minutes - even pull / stroke count less than 25 (very easy)		
Main Set #2-15 Minutes		Focus: Muscular Endurance	
Damper Setting	Damper lever: 3-5		
Set Notes	Focus on your breathing as you bring the bars back to the starting position; lead with legs		
Display Setting	Time		
Work Interval	90 SECONDS ON / 90 SECONDS OFF = 3 MINUTES		
		NOTE: ON EQUALS A STROKE RATE OF 30 PLUS / OFF EQUALS A STROKE RATE OF LESS THAN 25	
		REPEAT THE 3 MINUTE BLOCK 5 TIMES FOR A TOTAL OF 15 MINUTES	
Warm Down-5 minutes		Very easy pulling - keep the stroke rate less than 25 for entire duration	
		Beginning Weight:	Ending Weight:
			Loss Gain (Loss):

****For information on technique and damper setting please visit www.concept2.com**

Workout Notes: Keep a close eye on the interval duration for each set to avoid getting too tired early in the workout. The idea is to get progressively stronger with each "on/off" interval - so plan ahead and stay mentally focused. Keep your blood sugar levels topped off with your isotonic drink during your transition intervals.

Coach Robb's Power Workout #3		Workout Focus: Generating Maximum Power/Lactate Tolerance	
	Description	Intensity	
Warm Up-500 Meters		Focus: Gradual Warm Up	
Damper Setting Elapsed Time	Damper lever: 2-3 5 Minutes - even pull / stroke count less than 25 (very easy) Stop and stretch if you feel any tight muscles	40%	
Main Set #1-5 x 1 Minute Intervals		Focus: Muscular Power	
Damper Setting Display Setting Set Notes Work Interval Rest Interval	Damper lever: 5-7 Power Try to match the same power output with each 100 meter (we are after a consistent average) 1 Minute at maximum pull power 1 Minute at a very easy pull rate Repeat the 1-1 minute interval 5 times	90-95% Less than 50%	
Transition-500 Meters		Focus: Transition Set	
Damper Setting Elapsed Time	Damper lever: 2-3 5 Minutes - even pull / stroke count less than 25 (very easy) Stop and stretch if you feel any tight muscles	40%	
Main Set #2-5 x 1 Minute Intervals		Focus: Muscular Power	
Damper Setting Display Setting Set Notes Work Interval Rest Interval	Damper lever: 5-7 Power Try to match the previous set's average power output! 1 Minute at maximum pull power 1 Minute at a very easy pull rate Repeat the 1-1 minute interval 5 times	90-95% Less than 50%	
Transition-500 Meters		Focus: Transition Set	
Damper Setting Elapsed Time	Damper lever: 2-3 5 Minutes - even pull / stroke count less than 25 (very easy) Stop and stretch if you feel any tight muscles	40%	
Main Set #3-5 x 1 Minute Intervals		Focus: Muscular Power	
Damper Setting Display Setting Set Notes Work Interval Rest Interval	Damper lever: 5-7 Power Try to hold your form and power output as fatigue settles in - focus on your breathing! 1 Minute at maximum pull power 1 Minute at a very easy pull rate Repeat the 1-1 minute interval 5 times	90-95% Less than 50%	
Warm Down-500 Meters		Very easy pulling - keep the stroke rate less than 25 for entire duration	
		Beginning Weight: (Loss):	Ending Weight: Loss Gain

****For information on technique and damper setting please visit www.concept2.com**

Workout Notes: Make sure you have the display set to power wattage so that you can get an idea of how consistent you are for the entire 100 meter intervals. If you see your power curve falling off somewhat, you need to initiate the pull with your quads and gluts. The intensity is high for these intervals so hydration and calorie replenishment need to be a top priority throughout and immediately following this workout.

Coach Robb's Power Workout #4		Workout Focus: Generating Maximum Power/Lactate Tolerance	
	Description	Intensity	
Warm Up-10 Minutes		Focus: Gradual Warm Up	
Damper Setting Elapsed Time	Damper lever: 2-3 10 Minutes - even pull / stroke count less than 25 (very easy) Stop and stretch if you feel any tight muscles	40%	
Main Set #1-15 Minutes		Focus: Power Intervals	
Damper Setting Display Setting Set Notes Interval Protocol	Damper lever: 5-7 Wattage Stay in control even though you will putting out a high effort of pulling with arms/pushing with legs During the first 30 seconds, you need to watch the wattage display - POWER IS KING! Max power output for 30 Seconds / 30 Seconds Active Recovery REPEAT THE 30" ON / 30" OFF A TOTAL OF 15 TIMES FOR A TOTAL OF 15 MINUTES Stop and stretch if you feel any tight muscles	90%/40%	
Transition Set - 5 Minutes		Focus: Active Recovery	
Damper Setting Display Setting Transition Notes	Damper lever: 2-3 Wattage Keep your stroke count between 25-30 / Easy effort Stop and stretch if you feel any tight muscles	< 60%	
Main Set #2-15 Minutes		Focus: Power Intervals	
Damper Setting Display Setting Set Notes Interval Protocol	Damper lever: 5-7 Wattage Stay in control even though you will putting out a high effort of pulling with arms/pushing with legs During the first 30 seconds, you need to watch the wattage display - POWER IS KING! Max power output for 30 Seconds / 30 Seconds Active Recovery REPEAT THE 30" ON / 30" OFF A TOTAL OF 15 TIMES FOR A TOTAL OF 15 MINUTES Stop and stretch if you feel any tight muscles	90%/40%	
Warm Down - 5 Minutes		Focus: Active Recovery	
Damper Setting Display Setting Transition Notes	Damper lever: 2-3 Wattage Keep your stroke count between 25-30 / Easy effort Stop and stretch if you feel any tight muscles	< 60%	
		Beginning Weight: (Loss):	Ending Weight: Loss Gain

****For information on technique and damper setting please visit www.concept2.com**

Workout Notes: *Familiar notes with revised durations.*

This workout is going to "force" the muscles throughout your body to produce the greatest amount of power in the shortest amount of time. Keep in mind, when the power is up the potential of pulling a muscle rises quickly - stay mentally focused to avoid this unnecessary set back. With the display set to wattage, you will capture a visual of what your body is actually producing.

Coach Robb's Power Workout #5		
Workout Focus: Generating Maximum Power/Lactate Tolerance		
	Description	Intensity
Warm Up-500 Meters		
Focus: Gradual Warm Up		
Damper Setting Elapsed Time	Damper lever: 2-3 5 Minutes - even pull / stroke count less than 25 (very easy) Stop and stretch if you feel any tight muscles	40%
Main Set #1-500 Meter Interval		
Focus: Muscular Power/Lactate Tolerance		
Damper Setting Display Setting Set Notes Work Interval	Damper lever: 5-7 Distance Capture your elapsed time to cover 500 meters at a comfortably fast pull rate 500 Meters for Time:	85-90%
Recovery: half of the elapsed time to complete the interval		
Main Set #2-500 Meter Interval		
Focus: Muscular Power/Lactate Tolerance		
Damper Setting Display Setting Set Notes Work Interval	Damper lever: 5-7 Distance Strive to maintain (or beat your first 500 Meter Interval) 500 Meters for Time:	85-90%
Recovery: half of the elapsed time to complete the interval		
Main Set #3-500 Meter Interval		
Focus: Muscular Power/Lactate Tolerance		
Damper Setting Display Setting Set Notes Work Interval	Damper lever: 5-7 Distance Strive to maintain (or beat your first 500 Meter Interval) 500 Meters for Time:	85-90%
Recovery: half of the elapsed time to complete the interval		
Main Set #4-500 Meter Interval		
Focus: Muscular Power/Lactate Tolerance		
Damper Setting Display Setting Set Notes Work Interval	Damper lever: 5-7 Distance Strive to maintain (or beat your first 500 Meter Interval) 500 Meters for Time:	85-90%
Recovery: half of the elapsed time to complete the interval		
Warm Down-500 Meters		
Very easy pulling - keep the stroke rate less than 25 for entire duration		
Beginning Weight: _____ Ending Weight: _____		Loss Gain
(Loss): _____		

****For information on technique and damper setting please visit www.concept2.com**

Workout Notes: with the distance and resistance levels being kept consistent from set to set, strive to maintain a consistent pace for each power block. Remember, your goal is "teach" your body what it feels like to work at a high output level physically while staying relaxed mentally – push through that glass ceiling of fatigue! If you have a big deviation in time, then you will have missed the "lesson" of this workout. Hydrate and stretch as necessary.

Coach Robb's Power Workout #6		Workout Focus: Generating Maximum Power/Lactate Tolerance	
	Description	Intensity	
Warm Up-500 Meters		Focus: Gradual Warm Up	
Damper Setting Elapsed Time	Damper lever: 2-3 5 Minutes - even pull / stroke count less than 25 (very easy) Stop and stretch if you feel any tight muscles	40%	
Main Set #1- Pacing		Focus: Muscular Power/Lactate Tolerance	
Damper Setting Display Setting	Damper lever: 5-7 Distance		
Set Notes Work Interval	Shorter intervals, increase the effort! Watch your form to avoid injury or strains 100 Meters at maximum pull power	90-95% Less than 50%	
Rest Interval Work Interval	200 Meters at a very easy pull rate 100 Meters at maximum pull power	90-95% Less than 50%	
Rest Interval Work Interval	200 Meters at a very easy pull rate 100 Meters at maximum pull power	90-95% Less than 50%	
Rest Interval Work Interval	200 Meters at a very easy pull rate 100 Meters at maximum pull power	90-95% Less than 50%	
Rest Interval	200 Meters at a very easy pull rate	Less than 50%	
Transition-500 Meters		Focus: Transition Set	
Damper Setting Elapsed Time	Damper lever: 2-3 5 Minutes - even pull / stroke count less than 25 (very easy) Stop and stretch if you feel any tight muscles	40%	
Main Set #2-Pacing		Focus: Muscular Power/Lactate Tolerance	
Damper Setting Display Setting	Damper lever: 5-7 Distance		
Set Notes Work Interval	Shorter intervals, increase the effort! Watch your form to avoid injury or strains 100 Meters at maximum pull power	90-95% Less than 50%	
Rest Interval Work Interval	200 Meters at a very easy pull rate 100 Meters at maximum pull power	90-95% Less than 50%	
Rest Interval Work Interval	200 Meters at a very easy pull rate 100 Meters at maximum pull power	90-95% Less than 50%	
Rest Interval Work Interval	200 Meters at a very easy pull rate 100 Meters at maximum pull power	90-95% Less than 50%	
Rest Interval	200 Meters at a very easy pull rate	Less than 50%	
Warm Down-500 Meters		Focus: Transition Set	
Damper Setting Elapsed Time	Damper lever: 2-3 5 Minutes - even pull / stroke count less than 25 (very easy) Stop and stretch if you feel any tight muscles	40%	
Beginning Weight:		Ending Weight:	Loss Gain
(Loss):			

****For information on technique and damper setting please visit www.concept2.com**

Workout Notes: Make sure you have the display set to power wattage so that you can get an idea of how consistent you are for all of the 100 meter intervals. If you see your power curve falling off somewhat, you need to initiate the pull with your quads and gluts. The intensity is high for these intervals so hydration and calorie replenishment need to be a top priority throughout and immediately following this workout.

Coach Robb's Power Workout #8		Workout Focus: Power Pyramid	
	Description	Intensity	
Warm Up-500 Meters		Set Focus: Gradual Warm Up	
Damper Setting Elapsed Time	Damper lever: 2-3 5 Minutes - even pull / stroke count less than 25 (very easy) Stop and stretch if you feel any tight muscles	40%	
Main Set #1		Set Focus: Power Pyramid	
Damper Setting Display Setting Set Notes	Damper lever: 5-7 Distance Don't surpass either duration or output so that you finish the set strong!	Intensity	
Interval Outline	100 Meters at maximum pull power / 100 Meters active recovery	95% / 50%	
Interval Outline	200 Meters at maximum pull power / 100 Meters active recovery	90% / 50%	
Interval Outline	300 Meters at maximum pull power / 100 Meters active recovery	85% / 50%	
Interval Outline	400 Meters at maximum pull power / 100 Meters active recovery	80% / 50%	
Interval Outline	500 Meters at maximum pull power / 100 Meters active recovery	80% / 50%	
Transition-500 Meters		Focus: Transition Set	
Damper Setting Elapsed Time	Damper lever: 2-3 5 Minutes - even pull / stroke count less than 25 (very easy) Stop and stretch if you feel any tight muscles	40%	
Main Set #2		Set Focus: Reverse Power Pyramid	
Damper Setting Display Setting Set Notes	Damper lever: 5-7 Distance Don't surpass either duration or output so that you finish the set strong!	Intensity	
Interval Outline	500 Meters at maximum pull power / 100 Meters active recovery	80% / 50%	
Interval Outline	400 Meters at maximum pull power / 100 Meters active recovery	80% / 50%	
Interval Outline	300 Meters at maximum pull power / 100 Meters active recovery	85% / 50%	
Interval Outline	200 Meters at maximum pull power / 100 Meters active recovery	90% / 50%	
Interval Outline	100 Meters at maximum pull power / 100 Meters active recovery	95% / 50%	
Warm Down-500 Meters		Set Focus: Bring Heart Rate Down / Re-distribute the blood back to heart region	
Damper Setting Elapsed Time	Damper lever: 2-3 5 Minutes - even pull / stroke count less than 25 (very easy) Stop and stretch if you feel any tight muscles	40%	
Beginning Weight:		Ending Weight:	
		Difference:	

****For information on technique and damper setting please visit www.concept2.com**

Workout Notes: This workout is going to hold you accountable as the distance varies, but the recovery window stays constant (pay close attention to your distance and effort level). During your recovery window, focus on breathing through your belly to maximize your oxygen uptake. Maintaining proper form will keep you from any unnecessary injuries or muscle pulls - though it sounds crazy, but if you let your blood sugar levels drop, your chance for improper form will go up incrementally.

Coach Robb's Recovery Row Workout #1		
Workout Focus: Active Recovery		
	Description	Intensity
Warm Up-500 Meters		
Focus: Gradual Warm Up		
Damper Setting Elapsed Time	Damper lever: 2-3 5 Minutes - even pull / stroke count less than 25 (very easy) Stop and stretch if you feel any tight muscles	40%
Main Set #1-500 Meters Even		
Focus: Muscular Endurance		
Damper Setting Display Setting Set Notes Work Interval Recovery Interval	Damper lever: 2-3 Distance Stay in control even though you will putting out a high effort of pulling with arms/pushing with legs 400 Meters for time (65% Effort) - Strokes per minute below 30 100 Meters - easy pull rate; stretch and re-hydrate as necessary Stop and stretch if you feel any tight muscles	65% 50%
Main Set #2-500 Meters Even		
Focus: Muscular Endurance		
Damper Setting Display Setting Set Notes Work Interval Recovery Interval	Damper lever: 2-3 Distance Stay in control even though you will putting out a high effort of pulling with arms/pushing with legs 400 Meters for time (65% Effort) - Strokes per minute below 30 100 Meters - easy pull rate; stretch and re-hydrate as necessary Stop and stretch if you feel any tight muscles	65% 50%
Main Set #3-500 Meters Even		
Focus: Muscular Endurance		
Damper Setting Display Setting Set Notes Work Interval Recovery Interval	Damper lever: 2-3 Distance Stay in control even though you will putting out a high effort of pulling with arms/pushing with legs 400 Meters for time (65% Effort) - Strokes per minute below 30 100 Meters - easy pull rate; stretch and re-hydrate as necessary Stop and stretch if you feel any tight muscles	65% 50%
Warm Down-500 Meters		
Very easy pulling - keep the stroke rate less than 25 for entire duration		40%
Beginning Weight: (Loss):		Ending Weight: Loss Gain

****For information on technique and damper setting please visit www.concept2.com**

Workout Notes: This workout will be low on the intensity side but still incorporating perfect form to engage the muscles necessary for even levels of power. Focus on belly breathing to deliver the maximum amount of oxygen as possible. Stop and stretch at any time you feel the muscle groups tightening up - avoid any future muscle pulls or strains.

Coach Robb's Recovery Row Workout #2		
Workout Focus: Active Recovery		
	Description	Intensity
Warm Up-500 Meters		
Focus: Gradual Warm Up		
Damper Setting Elapsed Time	Damper lever: 2-3 5 Minutes - even pull / stroke count less than 25 (very easy) Stop and stretch if you feel any tight muscles	40%
Main Set #1-500 Meters Intervals		
Focus: Muscular Endurance		
Damper Setting Display Setting Set Notes Work Interval	Damper lever: 2-3 Distance Lead with your legs - let your arms come back before your legs 500 Meters: 50 meters "on" with a pull rate above 35 / "off" with a pull rate less than 25 Stop and stretch if you feel any tight muscles	Less than 65%
Main Set #2-500 Meters Even		
Focus: Muscular Endurance		
Damper Setting Display Setting Set Notes Work Interval	Damper lever: 2-3 Distance Even effort - pull with arms/pushing with legs/focus on your belly breathing 500 Meters for time (65% Effort) - Strokes per minute below 30 Stop and stretch if you feel any tight muscles	65%
Main Set #3-500 Meters Even		
Focus: Muscular Endurance		
Damper Setting Display Setting Set Notes Work Interval	Damper lever: 2-3 Distance Lead with your legs - let your arms come back before your legs 500 Meters: 50 meters "on" with a pull rate above 35 / "off" with a pull rate less than 25 Stop and stretch if you feel any tight muscles	Less than 65%
Warm Down-500 Meters		
Very easy pulling - keep the stroke rate less than 25 for entire duration		40%
Beginning Weight: (Loss):		Ending Weight: Loss Gain

****For information on technique and damper setting please visit www.concept2.com**

Workout Notes: This workout is completely aerobic - from beginning to end (notice the indicated intensity zones). Focus on your belly breathing technique and make sure that you don't tighten up and restrict your breathing patterns. During the pull phase, feel for the pulling power coming from in between your shoulder blades then assisted with your legs. Stop and stretch at any time you feel a muscle group tighten up. The goal is for your flexibility to become enhanced during this workout - stretch post workout to test this theory.

HOW TO CREATE CHAMPIONSHIP SPEED – PERIODIZATION

At both the amateur and professional levels, the racing season has increased to the point where the racer is competing nearly year round and actually inhibiting his or her ability to improve physically as a racer. It is unrealistic to think that a racer can be on top form every weekend from January through December. Throughout the year, the body needs to be provided the opportunity to develop various energy systems through specific workouts along with a window of time to rest and recover from the stress loads applied to the muscles and the cardiovascular system for long term improvement. This is where Periodization comes into a racers program. Periodization answers how hard, how long and how often a racer should train to reap the benefits of training without getting burnt out or injured.

PERIODIZATION – An implementation program for the competitive racer

A racers life has literally become a lifestyle – sleep, eat, ride, train, repeat until the next race. However, this lifestyle of training, doesn't allow a racer to decide to start training seriously for four weeks and then be ready for the season's first big race. On the other hand, hitting the open road on your road bike hard the Monday after your big race and riding every day until next years race isn't productive either. When you do this, you don't push the body beyond its normal performance level (because you are fatigued) and in turn don't get faster on the track. The key to faster speeds on the track is rest and food off of the track to allow the body to adapt to the training loads.

As a competitive racer, you need to look at a year as four different seasons of performance development. At Coach Robb, we break the year into four training "seasons": Pre-Season, Pre-Competitive, Competitive and Off Season. Each season has a different performance objective to optimize the racers training time for maximum results:

Pre-Season: developing maximum aerobic capacity, muscular strength and flexibility; this is also an ideal time to work with your riding coach to help with technique and mechanics.

Pre-Competitive: continued development of your aerobic engine, final stage of maximum strength development and the implementation of slight lactate tolerance intervals.

Competitive: specialization is the main component of this season. Your anaerobic threshold and sprint training should make up the high quality workouts during the week. Also during this season is the increased need for rest – ideally one complete day of rest per week to help you recover both mentally and physically.

Off Season: this is ideally four to six weeks in duration where you deviate away from heavily structured training. This is where you back to exercising verses training. You don't want to become so inactive that you begin to lose the conditioning you have worked so hard to achieve throughout the year; however, you do what to remain active and healthy.

Important note: you can cycle through these seasons throughout the year as long as you are peaking two to three times throughout the season. It is very difficult to maintain the high level of performance every week without allowing for some down time for your body to rebuild (mentally and physically). How and when you cycle through your season is established by your race goals and associated race schedule – see step one below.

PERIODIZATION – STEP ONE: ESTABLISHING GOALS

Establishing long term goals and developing a plan for achieving each goal. This step needs to be quantified, simple, optimistic and also realistic. Though this sounds like an easy task, it is going to take some real brain storming to narrow this down first step down and onto paper. Here is an example of an unrealistic long term goal: “I want to be fast”. There is no way to quantify fast and there is no time line established to complete and it doesn't tell you who you are setting your standards against.

However, if you say: “I want to be the top local rider in my class by the area qualifier for Loretta's” – this is quantified, specific and with a little research you are able to determine what it is going to take to surpass the current top riders to achieve the status you are looking for.

At **Coach Robb** we have our clients establish three sets of goals – 3 months, 6 months and 12 months. If you would like a copy of this **Goal Profile**, please contact robb@earthlink.net for your personal copy. If you have established goals in past seasons and you have had troubles obtaining your goals, feel free to forward your goals to robb@earthlink.net and I will be happy to review and help you develop some training objectives to help you achieve your personal goals for this season. The most important thing to remember when you are sitting down to establish your goals is that they need to be specific and have a goal date applied to each goal. Without specific goals, you will quickly lose your motivation to stick to the homework, especially when it becomes difficult (due to either the duration or intensity levels required).

PERIODIZATION – STEP TWO: DETERMINING A STARTING POINT WITH YOUR TRAINING

If you are starting at a minimum fitness level, you will have to increase your overall strength and endurance before your dive into a comprehensive performance program. As a general rule of thumb, don't increase your duration of your overall workouts by more than 5-8% every other week. Once you have been consistent with some level of training for six to eight weeks without any physical set backs, it is time to determine exactly where your fitness levels are at – this will identify your strengths and weaknesses and what to address with daily training to maximize your training time.

The main concept to keep in mind when it comes to training is to strengthen your weaknesses that have been specifically identified in your field testing. Racers, like any athlete, have a tendency to complete workouts doing the elements that we are already strong in. For example, in the gym, you rarely see racers working their legs in the gym due to the high levels of lactic acid and associated heart rate levels. If you use a Concept 2 rowing unit as a form of cross training, and don't have good opening lap speed, how often do you complete high intensity repeats to increase your strength and lactate tolerance? It is not that you are soft as a racer; it is simply human nature to do the activities that we are strong and confident with.

With this in mind, it is imperative for athletes to capture three key testing data points in testing data (no matter what time of year the testing is completed): aerobic capacity, muscular strength and lactate tolerance. There are numerous debates about which form of training are the most effective measures of your aerobic capacity, muscular strength and lactate tolerance. At **Coach Robb**, we are more interested in testing these three variables within the training modalities that you have been using over the last six to twelve months. The important thing to keep in mind with establishing baseline assessment numbers is to be consistent with your testing protocols. For example, when using the Concept 2 rower for your cardio training, it would not be a wise choice to use a running test for your lactate tolerance and aerobic capacity testing due to the different muscle groups and demands on the cardiovascular system – ultimately your testing data would be inaccurate.

If you would like me to provide some suggestions on how to determine your aerobic capacity, muscular strength and lactate tolerance given your current training methods, feel free to contact me directly at robb3@earthlink.net (please be sure to indicate what you are currently doing in the way of training to help me determine what is the most productive for you and your program).

PERIODIZATION – STEP THREE: ESTABLISHING A TRAINING PROGRAM BASED ON YOUR FIELD TESTING RESULTS

This is where a human performance specialist can be an asset to a racers development program – identifying where the most progress can be achieved in the shortest amount of time. The same applies to developing the training protocols that are going to maximize the appropriate energy systems to maximize the elements of aerobic capacity, muscular strength and lactate tolerance. As mentioned earlier, at **Coach Robb** we break the year up into the four seasons of Pre-Season, Pre-Competitive, Competitive and Off Season. During each season of training there are two key elements that have to be factored into the development of a racers training program: the energy system(s) being enhanced and the order in which they are put into place within a workout. For example, implementing muscular endurance protocols prior to explosive power protocols may actually be counter productive based on the training season (based on race goals and the physiological adaptations needed) and the field testing results – we need to constantly work on your physiological weaknesses due to the fact that you are only as strong as your weakest link in your racing program.

As you can ascertain, there are many elements to human performance! Take the time to determine your weaknesses in your human motor, train these components on a consistent basis and then enjoy the fruits of your labor out at the races.

ENERGY SYSTEMS: SPECIFIC COMPONENTS TO IMPROVED SPEED & ENDURANCE

There are many different ways to train, depending on who you listen to. Though each approach is designed to improve a distinct function, there is always some overlap. The two ends of the spectrum are aerobic to anaerobic and here we will discuss the five elements that fill up the middle of this spectrum. The key to ultimate success in racing is to combine all of the following elements into your training so that you will be able to compete closer to your anaerobic threshold for a longer period of time without fading. As we discuss the following energy systems, keep in mind that the various types of training are defined as a percentage of your current field testing and maximum HR (specific to the discipline you are using for training – road cycling, mountain biking, running, swimming, rowing, etc.). If you haven't completed a Time Trial/Max HR test, please refer to the initial testing that is necessary to identify and enhance the five energy systems we are going to discuss: **Explosive Speed, Sprint Speed, VO2, Anaerobic Threshold and Endurance.**

Explosive Speed

This high energy training is to work above your maximal time trial effort in order to develop power and the ability to throw in bursts of speed when necessary (i.e. to bridge to a rider in front of you or after you go down and need to restart your bike) and to finish a race strong. The duration of these intervals is usually between 15 and 30 seconds and can be completed 4 to 8 times while maintaining high output levels. You will be enhancing your fast twitch fibers A (slightly oxidative) and fast twitch B (anaerobic). Adjust your recovery time to allow for full recovery – don't begin your next interval until your HR is around 20 beats above your resting HR. The fatigue levels associated with this type of training is high and should not be performed within more than twice a week with a minimum of 2 days of recovery in between.

Sprint Speed

This type of training helps you adapt to high levels of lactic acid and oxygen debt. The major benefit to this type of training is that it teaches you how to vary your speed within a race without depleting your glycogen storages (i.e. bonking). The duration of these intervals is usually between 30 seconds and 2 minutes and can be completed 4 to 6 times while maintaining high output levels. You will be enhancing your fast twitch fibers A and B as well as your slow twitch fibers. Each interval needs to be started fully rested. If you allow for this to happen, you will split your energy sources evenly between anaerobic and aerobic. In my opinion, this type of training is the most productive for high level racing, yet is the most overlooked within a racers program. High level racing requires that you get up to a fast pace quickly and then maintain it for the entire duration. During the first lap, your respirations will increase, lactic acid will accumulate and your effort level will be very high. If your muscles are trained to cope with the lactic acid level and oxygen debt of the initial sprint, your body will not be as "shocked" as a body that has not familiarized itself with this glycogen burning byproduct (i.e. lactic acid). Due to the higher levels of lactate, you will experience significant muscle soreness and stiffness so keep the frequency of these workouts to two times per week (with a minimum of three days of rest for optimum performance).

VO2 Max

This type of training gets a lot of publicity and is tossed around by many performance coaches as the key indicator of ability. There is credibility to this mind set due to the fact that a racer that has a greater oxygen uptake number should also indicate a greater aerobic capacity and hence the fastest racer – it is not that simple. In a race, physical capacities as racers come down to combinations of all the other elements in one's performance: anaerobic thresholds, technique and efficiency while fatigued and desire.

The benefit associated with this type of training is that your heart pumps a lot of blood per beat and your stroke volume is elevated during the recovery phase, which allows more blood to be pumped during the next working phase. More blood means more oxygen. By elevating your VO2 max, will allow you to perform closer to your aerobic capacity. The duration of these intervals is usually between 2 and 10 minutes and are progressive (you will elevate your HR to a high output level within the first two minutes and then maintain for the duration of the interval). Your interval count should be no more than 4 times in order to maintain workout quality. You will be enhancing your fast twitch fibers A as well as your slow twitch fibers. Your rest interval will be half of your work duration. One interesting side note, since your VO2 Max is a numerical value determined in relation to body weight, the leaner you are the higher your VO2 maximum due to the increased mitochondria and capillaries (in relation to body fat) present to deliver oxygen. These types of workouts can be completed three to four times a week with adequate hours of quality sleep and consistent food intake to enhance the recovery opportunity.

**** NOTE: HERE IS A GREAT RESOURCE AVAILABLE TO HELP YOU CALCULATE AND EVALUATE YOUR VO2 MAX NUMBERS INITIALLY AND THROUGHOUT THE RACE SEASON:**
<http://www.concept2.com/us/interactive/calculators/vo2max.asp>

Anaerobic Threshold

At your anaerobic threshold, lactic acid begins to diffuse back into the bloodstream for use as a fuel. If you slow down, you will activate your aerobic system; if you speed up, you will produce lactic acid at a faster rate than you can diffuse it. Anaerobic Threshold training teaches your body to perform at the highest point possible without exceeding your anaerobic threshold. The duration of these intervals is usually between 1 and 3 minutes. Your interval count can be as minimal as 10 and as many as 50 (depending on the interval duration) and still maintain overall quality. You will also be enhancing your fast twitch fibers A as well as your slow twitch fibers. The rest intervals are short - between 20 and 60 seconds. It is the enhancement of your Anaerobic Threshold in conjunction with your VO2 Max that makes the ideal racer. The combination of these two performance elements allows the racer to perform at a higher level of output and for the entire duration of the race! Anaerobic threshold training is not as demanding as VO2 max training; your day to day recovery will be quick. By keeping your workout recovery times to a minimum, you are stimulating your aerobic metabolism more than you're anaerobic. Your lactate levels are not nearly as high (resulting in less residual soreness). Additionally, you are breaking the effort into shorter segments than in distance training which allows you to perform at a higher intensity level developing your aerobic energy stem to burn more fatty acids in proportion to glycogen. This side benefit leads to a leaner body which in turn drives up your VO2 Max – see how this disciplined form of training has all kinds of fringe benefits? Most importantly, working at this level of intensity simulates race pace and all of the physiological changes that occur within a race. As the body becomes more familiar with this effort, the easier the racing becomes.

Aerobic Training

Aerobic Training teaches your body to conserve glycogen and burn fatty acids as a primary fuel source. Benefits to enhancing your aerobic engine: you will engage the fat burning process within the first 10 to 15 minutes of aerobic exercise; expedites the delivery of oxygen to working muscles; increase your stroke volume within the heart; increases the capillary density within the muscles; increases the mass and number of mitochondria and helps release ATP aerobically. The ironic element of Aerobic Training is that it is the discipline of training that gets pushed aside first, yet has substantial benefits. Because we are so acclimated to the “No Pain, No Gain” mentality, we have tendency to think that the easy, long workouts are not productive. If you want to get fast – go long and at measured aerobic enhancement intensity! The duration of Aerobic Training intervals are usually between 15 minutes and 3 hours. Due to the continuous nature of Aerobic Training, there isn't any actual interval count. You will be enhancing your slow twitch fibers with this type of training. A couple words of caution with this type of training. First, don't check out mentally and go too easy. You need to be at 60-70% of your maximum heart rate to reap the physiological benefits we are looking for during these types of workouts. Secondly, though the intensity is low, don't jeopardize your mechanics of whatever type of training you are doing (i.e. pedal mechanics, swim stroke, etc.) to avoid any unnecessary injuries. These types of workouts are ideal for working on mental rehearsal and breathing focus (more on these elements in future articles).

As you can see, each of the energy systems provides important physiological benefits to a racers performance program. When you incorporate the proper workouts into a week of training (based entirely on your race Periodization – Pre Season, Pre competitive, Competitive) you are building a human body that is as capable as any motor that a mechanic can build for you. It just takes a little bit of research and field testing on behalf of the racer to determine how to put all of the elements together at the right time and at the correct intensity levels for optimum performance.

5 CHARACTERISTICS OF A CHAMPION

Here are 5 things you can implement tomorrow to improve your racing results.

Step 1: Establishing a Weekly Routine

Take your personal calendar and schedule the following elements for the next seven days (in this specific order):

- Hours of sleep you plan to get – daily!
- When you are going to eat your meals and snacks
- Hours you will be working
- Time you will be exercising (include intensity levels)
- What days you will compete

Your goal is to complete at least 75% to 80% of your scheduled elements on a weekly basis. Don't complicate things by trying to add a bunch of sophisticated elements to it. Just keep it basic and easy to follow. By focusing on all of the small elements, they add up to a very solid program. So, if you get your program moving to the next level immediately, establish a routine and stick to it!

Step 2: Establishing a Practice Routine

One of the most common mistakes we see is that riders will go to the track to practice and they just run laps without any evaluation of lap times. To make the most of your time on the track, capturing lap times will determine your consistency, along with the deviation between your fastest and slowest laps.

Practicing starts and working sections of the track is imperative to finding new found speed; however, you need to put all of the elements together to emulate actual race conditions as often as possible. As we have discussed in previous articles, what ends up happening on race day is that the body is exposed to high levels of speed and associated lactic acid that is produced as a by-product of burning glycogen. As the lactic acid accumulates within the blood, it begins to “burn” and mentally throws you off.

Depending on the nature of your track and its practice schedule, it is important to implement practice segments that include such physiological challenges such as negative split intervals, pacing intervals, pacing pyramids and sprint intervals. These types of intervals will challenge all of the various energy systems necessary to perform optimally during the race weekend. Remember, practice doesn't make perfect, specific and perfect practice makes perfect. For examples of negative split, pacing, pyramids and sprint intervals please email Robb directly at robb3@earthlink.net. You will be able to take these protocols to the track and implement immediately.

Step 3: Consuming sufficient calories for optimum performance and maintaining proper hydration

The challenge that you have when the intensity goes up is that it drains the stored muscle and liver glycogen very quickly. So what ends up happening is by the time you get to the end of the race, your gas tank (of glycogen) is essentially on empty. To give you a good analogy of that, it is kind of like building a big/strong motor, and then just not putting sufficient gas in it to finish the race. If you think about all of the strength training and all of the cardiovascular cross-training that you do, if you don't give your body enough fuel, it will not have the necessary amount of energy to finish the race strong. Many times we see late race fatigue and heat related sickness, due to the lack of necessary calories. For you, the racer, looking to get the most out of your body you need to approach food from a functional standpoint. Carbohydrates provide the necessary glycogen to your liver and muscles for exercise. Protein provides the necessary building blocks to repair torn down muscle tissue and fat provides the macro nutrient necessary for proper neurological functions and bodily needs (i.e. oil for skin and hair quality).

The second component that you can address to improve your speed is to avoid coming to the starting gate under-hydrated. Just as a rule of thumb, we are looking for around 40 to 50 ounces of water to be consumed on a daily basis - and that does not factor in the needs of what is lost in the form of sweat from exercise. To help offset this situation, you need to make sure that you are starting your day with a good eight to sixteen ounces of clear water to jump start your hydration levels. If you go to the starting line under-hydrated, let's say by 2-3%, it won't take long before the contractile strength of your muscle tissue is adversely affected (in some instances as much as 20-30%). The key here is to determine how much weight you are losing during a race (or intense practice session) to determine what your perspiration rate is for the duration of your session. Add in your total consumption of fluids consumed during the last hour of before your race (or practice session) and you will get an accurate idea of how fast you lose fluids in a given environment of temperature, humidity and race intensity. This information becomes priceless in regards to preparing your body to handle the demands of high intensity racing.

Step 4: Establishing a body that is resilient to stress through fresh fruits and vegetables along with sufficient amounts of quality rest

Though this step appears to be similar to Step 3 in regards to food, it is different from the stand point that we are discussing the body's ability to adapt to stress associated with training. When it comes to establishing a body that is resilient to stress, the two things that you need to pay attention to are:

- Eating raw fresh fruits and vegetables**
- How much rest you are getting each evening**

In regards to your fruits and vegetables, if you can afford and can find organic, this is ideal. However, at the very least, you want to lean towards raw and fresh food items whenever possible. Without getting into a dissertation about nutrition, you need to understand that there are three macronutrients: Carbohydrates, Proteins and Fat. You hear about them often and know what they are; however, the thing that makes them work at an optimum level is the integration of micronutrients (sourced from fresh fruits and vegetables). Whenever possible, you need be looking for a way to introduce raw and fresh fruits and vegetables (i.e. salad, vegetable & fruit salad or steamed vegetables). The bottom line is to avoid anything that comes out of a can along with trying to get as many servings throughout the day that we can without causing any gastrointestinal issues.

In regards to your sleep, you need to be striving to get eight to nine hours per evening. Please keep in mind that sleep is not how long you are lying in bed, but rather hours that you are in the state of sleep. When you get into REM (Rapid Eye Movement) Pattern Three, you are at a state of relaxation where your body releases hormones that are instrumental to getting stronger.

To help facilitate quality sleep try the following:

- Eat a small amount of high quality protein and complex carbohydrates 30 minutes before going to bed
- Drink 8 to 10 ounces of cold water
- Don't watch any television in your bedroom
- Keep the room as dark as possible
- Set the room as cool as you are comfortable with

Remember, you don't get stronger from your workouts, but from quality eating and sleeping! If you don't eat and rest, your body will never elevate itself to the next level of performance.

Step 5: Improve your speed by improving your range of motion through flexibility

Within your performance program, flexibility is probably one of the most boring yet most productive uses of your “extra” time. Most racers don't like to stretch because they don't see the direct benefits associated with it. Stretching is somewhat a nebulous concept. What are the benefits of stretching as it relates to a racer?

First, by increasing your range of motion (i.e. working on your flexibility), you are working towards re-establishing your normal range of motion within each muscle group and associated joints. Let's take a look at the shoulder for example. The shoulder is designed to have 360 degrees of range of motion. There are muscles surrounding the entire head of the shoulder joint on the front, side and back. As a racer, when you encounter a high speed get off, the impact on all of the supporting muscles is high.

As a racer, you need to be prepared for any contact with the ground (whether it's a high speed get off or whether it's a slow speed tip over), by having as close to 100% range of motion as possible. If the muscles that protect each joint are tight (hence limiting your range of motion) the impact of each fall has a much more negative effect (i.e. greater damage).

Let's take another look at your shoulder. When you fall and put your arm out in front of you, the head shoulder gets jammed back into that capsule extremely quickly. If the muscles are tight and the range of motion is limited, the net result is usually a torn muscle. If this injury isn't handled properly, scar tissue begins to form within the capsule of the injured shoulder joint and your range of motion is further limited due to the inelasticity of scar tissue.

Though scar tissue doesn't sound like a big deal, but as a competitive racer, it is detrimental to proper body positioning specific to the biomechanical demands of your sport. For example, if you've had a lower back injury, which has resulted in limited range of motion, you won't be able to maintain the proper position that produces maximum power output. Also, you may not be able to accomplish this important skill because you've got restrictions in your muscles surrounding your shoulder joint. It isn't a lack of desire or discipline, it is a physical limiter!

By focusing on your flexibility, you will be able to get into the proper position on the bike without self induced restrictions. The better your range of motion, the better your position on the motorcycle the faster your lap times will become.

5 KEY COMPONENTS TO BE SUCCESSFUL AT HIGH PROFILE RACING

Riders all over the country have achieved the ultimate goal of the year – making it to a high profile race or National Championship. However, the stress has shifted from just making the show, to finalizing an overall program that allows the rider to put his or her best race week together to validate why he or she deserves to be “in the show”. In this article, we will discuss five key components that riders need to focus on during the final preparation for high profile racing:

Consistency & Specificity, Anaerobic Endurance, Flexibility, Nutritional Support and Sleep.

Consistency & Specificity

Speed is a result of two specific variables – physical fitness and specificity. You won't become a fast racer by climbing rocks. At an elite level of racing, speed requires two elements. First, the pattern of joint and muscle coordination must be specific to your sport (accomplished with the help of an instructional coach). Second, speed must place specific demands on the muscles and associated energy systems (accomplished with the help of a human performance coach). Through a year long fitness program that is based on the scientific overload principle, an elite racer is moving his or her level of speed to the next level incrementally from month to month. This is evaluated through field testing and analysis. If the work loads are appropriate and rest follows, the body will respond and your overall fitness and resulting speed will develop. This is where consistency becomes factored into the equation. Your sleep patterns (see below), your pre race warm up, strength, flexibility and nutritional programs should not be adjusted too drastically at this time (unless something is obviously missing). However, if you need to make adjustments to your program, keep in mind that your body needs approximately four weeks to absorb the new program elements and commit it to muscle memory, so get busy so that you are ready come race week! One more thought regarding consistency and specificity – you need to make sure that you are subjecting your body to the exact conditions that you will experience during race week: riding in the middle of the day, establishing an eating and hydration plan prior to racing at race speed (very important that the intensity is high) and having a specific warm up and stretching routine prior to racing. Keep in mind that at Loretta's you have a long pre-staging wait and you will not be able to jump off of your Concept 2 rower and then go straight to the line – develop some sort of pre race routine that is applicable to Loretta's and incorporate it into your daily warm up routine (I strongly suggest the Man and Machine thera-band system – it is very specific to warming up racing specific muscles and is convenient to carry to the staging area and start line).

Anaerobic Endurance

By scientific definition, anaerobic endurance is the body's ability to resist fatigue at very high effort levels. Athletes that will perform well late in races (of any distance) will be athletes that have been implementing workouts that have focused on developing a large aerobic base and built up a tolerance for lactate (the by-product of burning stored glycogen). If your program has not been addressing these energy systems, please contact me and I will forward some specific workouts that will enhance these energy systems without leaving you too fatigued come race week.

Flexibility

Flexibility is a subject matter that frequently gets overlooked by many racers but ironically has a direct influence on body positioning and resulting speed for the racer on the bike. For example, tight hamstrings can also contribute to a tight lower back, which manifests itself by keeping the rider from standing when necessary! Examples of muscle tightness and how it is reflected in a racers position on the bike are numerous; however, a consistent and effective program of stretching may prevent such issues from occurring and result in a faster overall race speed. Also, flexibility can help avoid torn ligaments due to the lack of range of motion. When a joint can not go through its complete range of motion due to tight muscles, it will shift the impact of the fall to the attachments and/or insertions of the muscles. In addition to improving a racer's overall race speed (due to proper riding positioning) and avoiding any torn muscles, stretching following workouts also aids the recovery process by improving muscle cell's uptake of amino acids by promoting protein synthesis within muscle cells and by maintaining the integrity of muscle cells. If you are confused about what muscles you should stretch and/or how to stretch, drop me an email and I will send you a master stretching outline specific to your sport.

Nutritional Support

Dietary decisions are a mixture of four macronutrients: protein, fat, carbohydrates and water. How much of each you include in your diet has a great deal to do with how well you train and race – especially when it counts most! Let's look at each macronutrient's benefits and amount needed for optimum performance.

Protein: Protein is necessary to repair muscle damage, maintain the immune system, manufacture hormones and enzymes, replace red blood cells that carry oxygen to the muscles and produce up to 10 percent of the energy needed for intense workouts and races. Without getting too technical, protein is made up of 20 amino acids useable by the human body as building blocks for replacing damaged cells. However, there are nine amino acids that the body cannot manufacture by itself and therefore, must come from your diet. In regards to the amount of protein an elite racer needs on a daily basis, according to Peter Lemon, a noted protein researcher at Kent State University suggests about 0.020 to 0.022 ounces of protein per pound of body weight each day. Good sources of lean protein come from wild game or free ranging cattle, seafood, poultry and egg whites. Such foods and other high protein foods should be eaten throughout the day and not consumed in one meal.

Fat: Fat has been bounced around in so many ways no one knows what to think anymore. For elite racers, fat is very important because it assists with the manufacturing of hormones such as testosterone and estrogen, nerve and brain cells and is important for carrying and absorbing vitamins A, D, E, and K and also to help avoid colds and infections. In regards to the amount of fat an elite racer needs on a daily basis, aim for consuming 20 to 30 percent of your daily calories from fat. Good sources of fat (especially clean, unsaturated fats) include lean meats, coldwater fish such as tuna, salmon and mackerel. Additionally, oils and spreads of almonds, avocado, hazelnut, macadamia nut, pecan, cashew and olives offer great sources of monounsaturated and omega-3 rich fats.

Carbohydrates: carbohydrates have also become convoluted due to the discussion about high and low glycemic carbohydrates. Without getting into extensive food chemistry, the thing to remember is that some carbohydrates enter the blood stream sooner than others producing an exaggerated blood sugar response and quickly bringing out all of the negative elements of high insulin (a hormone released by the pancreas to regulate blood sugar levels) levels. Ideally an elite racer is consuming low glycemic carbohydrates and is also having a source of protein with each meal including carbohydrates. By combining the protein and the carbohydrates, you are creating an ideal absorption rate within the stomach and providing a more moderate glycemic meal (and stable energy levels). Just as a side note, if you are having a hard time losing those few last pounds, take a look at your source of carbohydrates. If they are high on the glycemic index, this may be your source of frustration. When the pancreas is working overtime, it actually inhibits your body's ability to utilize fat as a fuel source, converts carbohydrates and protein to body fat and moves fat into the blood and then to storage sites.

Water: here is a staggering statistic: race speed decreases by 2 percent for each 1 percent of body weight lost in dehydration. In a sport where racers are covering every square inch of their body (except for your nose and chin) with race clothing, the endothermic process is not able to do its job of dissipating heat through sweat. When you add to this challenge the fact that most racers don't consume enough fluids in their daily diet, the chance for chronic dehydration is quite high (resulting in compromised recovery and risk of illness). Most racers believe that if they drink when they are thirsty, they are ahead of the curve – wrong! With the human thirst mechanism engaged, dehydration is already under way. As a rule of thumb, racers need to be consuming 8 to 12 cups of water per day. However, some athletes sweat more than others and need to evaluate the loss of body weight during exercise. Weigh yourself prior to and immediately following exercise (of any type), for every pound of weight you have lost during the exercise, you are in need of two cups of water to begin the replenishment cycle. Additionally, you can use the frequency of urination as another evaluation tool – ideally once every two hours and your urine should be clear (unless you have just consumed a big meal or are taking vitamins). Food sources that facilitate your water intake include fruits and vegetables. So you can see that by consuming a balanced diet you pick up additional benefits without even trying. If you would like a list of menus that we use with our racers, or would like me to evaluate your current food profile, please email me directly and I will be happy to help put together a performance meal plan peaking for high profile races.

Sleep – Possibly the missing link!

When you look at the busy schedules that racers keep, it is difficult to fit sleep into the daily routine. Frequently as racers find time to be a premium, sleep is usually bounced around (by either going to bed late or getting up early). This pattern of sleep deprivation eventually leads to a drop in performance, feelings of depression and frustration with training and life in general. Cutting sleep short will eventually undermine all of your fitness and race speed because during sleep, the body releases growth hormones that repair damaged tissue resulting from the stress of training. As you increase the amount of either intensity or duration, the amount of sleep must also increase accordingly to maintain balance within the body. Ideally we are looking for eight to ten hours of sleep a night for optimum performance.

In addition to quantity of sleep, we are also concerned about the quality of sleep. Difficulty going to sleep and waking up several times throughout the night cuts into the benefits derived from a straight night of sleep. Here are some tips from a recent sleep study to help improve your quality of sleep as a racer:

- Be consistent on your bed time every day (including weekends)
- As you approach your bed time, unwind slowly by reading
- Sleep in a completely dark room, at a cool temperature
- Take a warm shower or bath prior to settling in for the evening
- If you are not lactose intolerant, drink warm milk to promote relaxation (if you are lactose intolerant, use non caffeinated herbal tea)
- Eat a small snack of either tuna or cottage cheese due to the high levels of sleep-inducing L-tryptophan
- Progressively contract and relax muscles to induce total body relaxation
- Avoid stimulants such as coffee, tea or cola in the last two hours before bed time
- Avoid large meals right before bed

Putting it all together

The key to any human performance program is addressing all of the rider's strengths and weaknesses and putting an emphasis on elevating the weaknesses to match the other strengths. I realize that this sounds odd to work on the weak elements; however, as an elite racer, you are only as good as your weakest link. Think about Mike Larocco (I am a big fan), he was always known as a racer in great shape, but one who couldn't buy a start! Imagine how many more wins and possible championships he could have put together, if he had gotten off the line and positioned himself up front early.

With this in mind, you can see that there are numerous elements that the body needs to perform at an elite level. If one element is missing, you will not be able to perform at an optimum level and you don't want to wait until a high profile race to find out what your weaknesses are. By the second half of a race, you will be able to identify those athletes that have a complete program due to the consistency in his or her results and confidence they possess when they come to the second half of the race. Prepared racers look forward to tough conditions, 100 degree weather and 39 other racers to test their fitness. If you look at the five variables we discussed here:

Consistency & Specificity, Anaerobic Endurance, Flexibility, Nutritional Support and Sleep, you will notice that outside of anaerobic endurance, the other variables don't require any additional "work" but rather attention to details. This is good news to an elite racer in his or her final preparations for a big race because as a rule of thumb, over this final stage of preparation, you are NOT going to gain any significant levels of fitness; however, you can lose a lot of fitness by overtraining (even if it is only by 1 percent) and doubting your current program. Slight adjustments are ok, but your program got you into the show, don't doubt yourself now! Relax, pay attention to the details and enjoy the fact that you are one of the fastest riders in the country.

Avoiding Early Season Burnout

Have you reached the month of April and noticed that you just don't have the motivation you had back in January? Are you falling asleep earlier in the evening and having to force yourself to get out of bed in the morning? Does it seem that you are no longer the first one to arrive at the track and one of the last to roll onto the track for practice? If these symptoms sound familiar, you are probably facing a case of early-season burnout.

As a racer, you can withstand a lot of stress and high load levels, but you reach a point where we need take a step back and recover, both mentally and physically. **Let's consider the characteristics of burnout and review some strategies to help you overcome this situation:**

Evaluate your short, mid, and long-term goals and honestly assess whether they are realistic given your other responsibilities, such as family and work. Do you have enough time to get the necessary ride time & workouts in to meet your goals, or do you find that riding time & workouts are adding another level of stress to your lifestyle? If you find that you are cramming everything in to get it all done, you need to re-evaluate your race goals. Remember, you don't have to drop out of a race just because you couldn't train exactly the way you intended. Instead, realign your expectations in light of the available training time. Don't let the likelihood of failing to meet your expected results rob you of the pleasure & challenge of participation.

Review your lap times and field-testing results and analyze how far you have come since the beginning of the year. If you haven't improved as much as you would have liked, then you need to look into your training protocols; something is obviously missing. If you currently don't have a coach to develop and analyze your weekly progress, then take your training log to a reputable coach and ask him or her for an analysis. Having an outside opinion of your protocols will help you more readily identify your missing workouts and physical weaknesses.

Take a week off from training and ask yourself what drew you to this sport in the first place. Remember how excited you were about completing your first race? Take each day of your week off and spend it going over old photos and revisiting your most memorable races. Rekindle that feeling by going back to your first race track. Even if there is no longer an race there, relive it on your own (safety pending) and re-create the experience.

Change the tracks you ride and train at. Change up your workout routine or even gym (logistics pending). The key here is to be creative and break the boredom that leads to burnout. When did you start identifying your riding sessions as "workouts or training" instead of "riding"? Think about it!

Hire a qualified coach to help you improve the productivity of your cross training efforts - make sure that your efforts are specific to your goal: becoming a fast rider who never fades! Coach Robb's motto is: "Work smart, not hard."

What to do in order to avoid the associated negative effects of burn out

Racers tend to train at levels much harder than they perceive them to be. This leads to many long-term deficiencies ranging from blood chemistry values to mental outlook. Each racer needs to know their max heart rate levels for all forms of training modalities used during the week [Note: these assessments need to be determined by field-testing and not calculated on general formulas]. With proper testing, you can establish training zones based on specific HR levels to ensure that you train the appropriate energy systems on any given day. Remember, if you have set realistic goals and you have the appropriate training protocols in place, you only need to increase duration and intensity levels. By training within the correct heart rate zones, you will eliminate the tendency to train too hard and too often. Pushing the envelope for extended periods of time depletes vital nutrients such as creatine and cytochrome C within the blood cells. Chronic neglect of sleep and nutrition only compounds this depletion issue.

Have your blood chemistry evaluated for any deficiencies. You need to identify any deficiencies that may inhibit performance, and more importantly, your overall health. Some common deficiencies we frequently see with our racers are low iron and CoQ10 levels. With some adjustments to your diet and eating nutritional meals on a regular basis, your blood chemistry will return to normal. Keep in mind that it takes six months to completely replace all of your muscle tissue; the body you have today is literally a reflection of what you have been consuming over the last six months.

Eat more food and more often. The most common scenario seen with our riders is that due to such a full schedule, they are often too busy to eat. To get a better idea of your caloric intake, keep a food log for four days (preferably two weekend days and two week days) and then evaluate the total grams of carbohydrates, protein, and fat that you have consumed for each day. There are many different theories as to which combinations work the best. However, each athlete responds to foods differently-carbohydrate sensitivity, slow metabolism, etc. Don't take on one diet or another; instead, document and evaluate to make sure that you are doing what is right for you. Having your blood tested at regular intervals will help determine if you are getting enough of the necessary macro and micronutrients to fill the indicated voids. The most consistent finding we have seen has been that athletes do not consume enough calories. This not only leads to fatigue and hinder performance, but more importantly your overall health because the necessary nutrients to rebuild muscle and immune system are inadequate.

Drink plenty of fluids (several studies suggest a half an ounce of water per pound of body weight per day), particularly water. When you realize that the average human body contains ninety-six pints of water and that sixty-four of these are intracellular, you quickly see the importance of hydration to the survival of an endurance athlete. When a muscle becomes dehydrated by only three percent, that muscle can lose between 10-20 percent of its contractile strength and also incurs an eight percent loss of speed. Imagine undermining all of your hard work by starting your workout under hydrated and then making the situation worse by not consuming adequate fluids and electrolytes (to facilitate the absorption of the water). Most athletes don't pay attention to how much body weight they lose in a regular workout, so they are not able to determine their hydration needs in an important hard workout or race. Remember, knowledge is power. Know what your typical losses are and how to replenish them.

Complete a Max HR assessment and establish specific HR training zones. Racers don't have problems "going hard," but rather "going easy." To many racers, this would seem counterproductive, given all of the hard work of a weekly schedule. However, active recovery days are just as beneficial as hard training days because they help get fresh blood flow into broken-down muscle tissue and also help loosen muscles for slow, passive stretching. What is the highest heart rate (HR) at which you can exercise and still get the benefits of active recovery? This training zone is a combination of your true max heart rate and your resting heart rate levels. Determining all of your training zones (from easiest to the hardest) requires capturing your resting heart rate for a minimum of four weeks to establish an up-to-date average and completing a max heart rate test every for eight to ten weeks to determine if your max heart rate has changed (the actual calculations of HR zones involve some additional calculations outside the scope of this article). Keep in mind that the heart is a muscle, and the stronger it gets, the lower your Max HR because it can push the necessary amount of blood and oxygen at a lower HR. Don't worry about a lower Max HR affecting your training levels, because your resting HR usually falls accordingly.

Add one hour a night to your sleep and add a nap on the weekends. Though this is the tip that costs nothing (other than your time) and is the most comfortable (if you can calm your mind), it is the most overlooked and understandably difficult to get the time. Rest is your body's opportunity to rebuild and repair muscle tissue (which is the purpose of training in the first place) and replenish the blood chemistry with foods you have consumed. If you break down a typical twenty-four hour day, you immediately lose 8-10 hours a day for work, an hour for traveling to and from work, four hours to family and friends and you have nine hours left (ideally). However, nothing is perfect in the world and things come up that shift the above numbers, so be flexible! Striving to get the necessary sleep is step number one; arranging your schedule to allow for more of it can be difficult. I would challenge you to set your day up around your sleep versus fitting it in around your activities.

Take one day off per week Don't be afraid to take a day off from riding & cross-training. This means no riding or training whatsoever, no short 20 rides or short gym workouts. If at all possible, don't wake up to an alarm. Start your day off with a good-sized breakfast full of low glycemic carbohydrates, clean and lean proteins, and healthy fats. If you have been consistent with your weekly and monthly workouts, you have nothing to fear. If you can, arrange to get a massage or a session of facilitated stretching from an experienced trainer at least once a month. This will help you relax and decrease your chances of a pulled muscle.

By implementing these energy creating concepts, you will see your body produce all new levels of speed, delay the onset of fatigue (i.e. late race fatigue)! If you have any questions about these suggestions, please email me directly at robb3@earthlink.net.

Heat and Humidity – two of the biggest challenges to stay cool and hydrated during training and races

As we exercise, our bodies burn the calories that that we consume (i.e. carbohydrates, proteins and fats). It is the breakdown of these calories and muscle movement that causes heat to build up and raise our core body temperature initiating the demands of the body to maintain its ideal body temperature of 98.60 degrees. There are several ways that the body dissipates heat (skin and exhalation for example); however, the most complex system involves your ability to sweat.

Simply put, water molecules evaporate from your skin removing heat energy, leaving water molecules on your skin making you feel cooler. The endothermic process of converting liquid to a gas is beyond the scope of this article; however, the ultimate goal is to maintain your body's ability to efficiently dissipate heat throughout exercise. What makes it difficult is dealing with elements that we don't have any control over – heat and humidity.

On hot days when there is little difference between the skin's surface temperature and the ambient air temperatures, the skin provides only small cooling benefits – increasing the importance of sweating to maintain your internal core temperature. In fact, above 95 degrees Fahrenheit you lose no heat at all from your skin – evaporation must do all of the work. Humidity decreases your body's ability to evaporate sweat because the air is already saturated with water vapor, slowing the evaporation rate. Though you and your clothes may be saturated, it is not helping you in your cooling process – sweat must evaporate to remove heat from your body – plain and simple. It is this concept that makes hydration so important; if you don't have enough fluids to produce sweat you will over heat guaranteed (along with the adverse side effects – performance and health wise).

On average, endurance athletes lose approximately 30-35 ounces of fluid per hour of exercise (the actual amount varies by body size, intensity levels and heat/humidity levels). There are numerous formulas floating around in the sports nutritional world regarding ideal food and fluid intake; however, keep in mind that there are three things that we need to evaluate regarding ideal performance nutrition: water intake, electrolytes and calories. It has been AEM's experience working with hundreds of athletes that the best way to formulate an ideal nutritional strategy is through trial and error. This formula requires good documentation on behalf of the athlete to track what is consumed, your workout duration and intensity levels along with average paces and HR levels. AEM has a data acquisition form that can be used by AEM athletes to facilitate this research. If you would like a copy of this form, please contact Robb directly.

Tips for training and racing in the heat and humidity

- Avoid over-hydrating on plain water
- Train at times that are relevant to your race (i.e. if you are going to start your run at 2:00 pm during a race, then practice running at this time dealing with the heat, humidity and sun burn)
- Wear only clothes that facilitate the evaporation process (avoid cotton at all costs)
- Cold fluids absorb faster than warm fluids; use insulated bottles
- Backing off of the intensity every so often and pouring cold water over your wrists and neck will help relieve your body of internal heat
- Pay attention to body signs that things are not going well: dry chills, becoming lightheaded or queasy are all indications to stop. Be smart!

LEARNING FROM A YEAR OF TRAINING AND RACING

This is the time of the year when you get an ideal opportunity to sit down and evaluate your past season. As athletes we tend to focus on what didn't go well instead of what we were able to accomplish. As competitive athletes who expect a lot from ourselves performance wise and can become disappointed when everything doesn't come together. However, with every performance provides insight to what is going on physically and physiological on that given day. The interesting part about training is when you are specific on the purpose of each workout (based on intensity/ duration/ rest interval and frequency) you as an athlete are able to ascertain your capabilities and adjust your performance goals accordingly.

This is why your Coach Robb Goal Profile is the foundation of all workouts – the evaluation of progress is based off of your average times for various interval distances (as dictated by your race schedule). For many athletes, they train “hard” but do not take the time to evaluate if the training is actually paying off in the way of improved performance. At Coach Robb, we evaluate the results submitted and update the master schedule and results database so that the next week's workouts are specific in regards to speed and intensity. To some athletes, this level of structure is too demanding due to the accountability that comes with quantified results but to others the acknowledgement of progress is what motivates them to get out the door training early the next morning. So what does all of this mean in regard to learning about a season that is now history? Three specific lessons:

First, you have the opportunity to look back at your training sessions and determine which type of workouts motivated you the most. For example, did you enjoy meeting others to train with or did training with other athletes just create a “race” every workout – be honest with yourself here. Remember, if you get to a point where you are not motivated to go to the workouts due to excessive stress, then your consistency will fall off (a very important component for competitive athletes).

Second, did your schedule provide you with adequate rest days to allow for adequate recovery? By keeping track of your Body Analysis, you begin to see a pattern between your weekly training schedule (i.e. hard days/easy days) and how your body is responding. If you are getting adequate rest, you will see a relatively low HR and consistently improving results. If you are not getting adequate rest, well, you see where this is headed.

Finally, the quantified evaluation of training and racing results strips the emotions away from the reality that you are either getting healthier, stronger and ultimately faster or not. It has always been the goal of AEM to have incremental improvement each year verses big gains that inevitably end in a severe injury that mandates taking time off of training and racing.

If you evaluate the reason why you became involved in athletics, the majority of athletes will say that it was for the improved health benefits. However, when it comes to garnering speed, it seems that this overall goal is put by the way side and expectations of the body are put at a level that can not be sustained for a long period of time. When you think about the elite athletes and the longevity of there race careers, you will notice that the career is relatively short (usually as a result of injury or burn out). Yes there are athletes that have great results, but if you evaluate closely, you will notice that the results are not year after year, but usually after taking some extended period of time off (to allow for recovery).

So take the time to reflect on where you have come from as an athlete and where you ultimately want to take your body. Then take these aspirations and compare them to your AEM Goal Profile. Now is the time to look back and determine EXACTLY what you would like to achieve and put the necessary elements together to make them a reality! Remember: Train Smart, Not Hard!

Strength Training: how to incorporate into your training schedule for increased speed and endurance

There are numerous professional opinions on whether or not strength training should be an instrumental part of a racer's training program. In my opinion, strength training is imperative for the successful racer at multi day races like Loretta Lynn's, Lake Whitney and Oak Hill. Overall body strength will help prevent the effects of cumulative fatigue and allow for proper bike position and efficiency on the bike throughout the entire week of racing. Also, full body strength is a complement to the other elements of a complete performance training program: endurance, flexibility, nutrition and mental preparedness.

Let's take a look at three direct **benefits of strength training** from a physiological stand point and how it relates to racing. First, it will increase the amount of force your muscles can exert on a particular object. As a racer, moving yourself from point A to point B for any extended period of time requires both muscular strength & endurance. When you add your body weight, the law of physics associated with resistance that exponentially adds resistance to the working muscle, force is a key component for finishing a race as strong as you started.

Second, strength training will permit your muscles to reach a maximum output of force in a shorter period of time. Even if you are not a big fan of science, hang in there with me for this concept. Weight training will increase and facilitate the balance of strength in all working muscles and the resulting motor units (which include motor nerves and muscle fibers). One nerve impulse can charge hundreds of fibers at once; a rapid series of multiple fiber twitches can generate maximum force quickly and for a long period of time. Weight training will "teach" your nervous system to recruit a wide variety of fibers. As one group of fibers fatigue, another group will be prepared to relieve the fatigued group. Without getting too complex, think about nerves as messengers from the brain which control every physical response. If motor nerves don't "tell" the muscle fibers to twitch, your muscles won't contract. The entire concept behind physical training is to teach your nervous system, with repeating particular muscular movements, to get the correct message to the working muscles. With a diversified strength program, you will initiate a message to include the number of fibers to be recruited, type of fibers used (fast twitch A or slow twitch B) and frequency of contractions. Remember, a diversified training program will recruit all of the fibers and the types of fibers needed for the required physical demands. This is the purpose behind sports specificity and related workout – the more specific the more productive.

Finally, the duration of time your muscles can sustain the level of force before exhaustion is extended. The overload principle is based on the concept of subjecting the muscles to slightly more load levels than it has incurred in the past. With incremental load levels, the muscles will increase the fiber solicitation and corresponding recruitment. With proper rest, the muscles will grow stronger by developing new muscle tissue as an adaptation to the load levels. With increased muscle mass, the muscles are able to exert higher levels of force and for extended periods of time before exhaustion. To capture a better idea of this concept, imagine you have muscles that fall under the category of primary and secondary muscles. The primary muscle groups are the obvious muscles that are responsible for assisting movement. The secondary muscle groups are also referred to as "assistors" for primary movement. However, once the primary muscle groups fatigue, the secondary muscles are required to step up to finish the task at hand. Strength training makes this task familiar to the secondary muscle groups at both the muscular and neuromuscular levels.

Three indirect benefits of strength training include stronger tendons and ligaments, greater bone density and enhanced joint range of motion. Concerning tendons and ligaments, weight training will increase the size and overall strength of both which will increase the stability of the joints that they surround. Bone density will increase as a by product of tensile force being placed on the bones – without this tensile force, the bones will actually become brittle and susceptible to breaking. An increased range of motion at the joint is due to the increased strength and size of the tendons and ligaments. This increased strength will enhance the ease of mobility within the joint due to tendon and ligament strength and resulting efficiency. When you look at all three of these components collectively, they address the concern of every racer: broken bones and torn up joints (particularly knees). Keep in mind that the ultimate goal of the muscles and a self protecting mechanism called the Golgi Apparatus are to keep the bones from being taken outside the normal range of motion. If you have a strong muscular system (accompanied with good flexibility), you will be able to take large impacts without the typical injuries because your body has the proper mechanisms to protect itself.

Now that we have justified the reason for incorporating strength training into your performance program, let's take a look at **how to incorporate strength training into your weekly training regimen**. The first variable to look at is where you are at in your race season. If it is early in the season, your focus is to prepare your body for the upcoming demands of your pre-competitive season (low priority racing). During this time frame, you are also looking to enhance your aerobic function (as discussed in part one of this series) so to keep the stress from becoming too stressful, the amount of weight is kept to a moderate level and three workout sessions a week. During the competitive racing season, the strength component of your program needs to be reduced to two sessions during the week to allow for ample rest for high intensity training and competition. For this article, we will assume that you are well into your competitive cycle and looking to peak at one or two key events during the summer.

It is important to take the time and evaluate the weaknesses of your current fitness through regular field testing. As racers, we tend to work on the elements that we like to do and usually are very good at. However, to complete yourself as a top racer, you have to identify your weaknesses and address these variables specifically. With our racers, we have pre-determined field testing dates to evaluate if the training programs we are implementing on a weekly basis are addressing the identified weaknesses of the racers. So if your field testing results show that you are not lacking in the strength department, your approach in the gym will be different to a racer who lacks overall physical strength.

MUSCULAR STRENGTH & ENDURANCE ASSESSMENT

The subject of strength assessment has had a lot of varying opinions on what is the correct format to assess strength as it relates to racing. At Coach Robb's, we incorporate two elements into the assessment equation: sport specific and gym specific load levels. Please keep in mind that the implementations of testing protocols are established based on the individual racer and his or her backgrounds, age and racing capabilities. **The following outline is merely an example of what can be used for assessment purposes.** Feel free to contact Robb (robb3@earthlink.net) to discuss the appropriate assessment model for you and your program.

Sport Specific Assessment (Rowing Example provided here. Substitute your sport and edit accordingly.)
[Note: you will need your heart rate monitor in a position where you can see easily throughout the test. If your watch has the ability to download the stored data, just focus on rowing and research the data afterwards.]

Warm up by rowing for 15 – very low intensity

Stretch passively for 5 minutes from head to toe

Row for another 5 minutes – low intensity

Stop and set the display to 500 meters with 1 minute recovery/rest interval:

Complete the following **testing protocol**:

500 meters at 90% 1 minute recovery (strive not to stop)

500 meters at 90% 1 minute recovery (strive not to stop)

500 meters at 90% 1 minute recovery (strive not to stop)

500 meters at 90% 1 minute recovery (strive not to stop)

500 meters at 90% 1 minute recovery (strive not to stop)

500 meters at 50% Active recovery

Stretch passively for 10 – 15 minutes from head to toe

As a **general rule of evaluation**:

8-10 seconds or more deviation – strength needs to be a high focus in the gym

4-6 second deviation – strength is a weakness in the racers program and needs to be addressed in the gym

1-2 second deviation – strength levels are strong and need to be maintained

The **key point of evaluation** is that it takes muscular strength to maintain proper body position (especially late in a race) and to offset late race fatigue without slowing down. Remember, our goal with strength training is to enhance your overall strength levels and then be able to maintain that output of power for longer periods of time.

MAX HEART RATE ASSESSMENT

The subject of strength assessment has had a lot of varying opinions on what is the correct format to assess strength as it relates to racing. At Coach Robb's, we incorporate two elements into the assessment equation: sport specific and gym specific load levels. Please keep in mind that the implementations of testing protocols are established based on the individual racer and his or her backgrounds, age and racing capabilities. **The following outline is merely an example of what can be used for assessment purposes.** Feel free to contact Robb (robb3@earthlink.net) to discuss the appropriate assessment model for you and your program.

Sport Specific Assessment (Rowing Example provided here. For a different sport, please email me for protocols.)

[Note: you will need your heart rate monitor in a position where you can see easily throughout the test. If your watch has the ability to download the stored data, just focus on rowing and research the data afterwards.]

Warm up by rowing for 15 – very low intensity
Stretch passively for 5 minutes from head to toe
Row for another 5 minutes – low intensity
Stop and set the display to 500 meters with 1 minute recovery/rest interval:
Complete the following **testing protocol**:

500 meters at 75% 1 minute recovery (strive not to stop)
500 meters at 80% 1 minute recovery (strive not to stop)
500 meters at 90% 1 minute recovery (strive not to stop)
500 meters at 100% 1 minute recovery (strive not to stop)

[NOTE: LOOK AT THE ENDING HEART RATE AND WATCH FOR 20-30 SECONDS AFTER YOU SHUT DOWN TO CAPTURE THE HIGHEST HEART RATE NUMBER ACHIEVED DURING THE TEST]

500 meters at 50% Active recovery

Stretch passively for 10 – 15 minutes from head to toe

Complete the following **gym testing assessment**:

Take each of your gym exercises and take the average weight amount that you have been using over the last two weeks. Complete as many repetitions that you can complete with good form (no swinging – no momentum) until you can not complete any more repetitions. Using a load level calculator (there are many of these calculators on the internet) you can determine what your max strength level is for each muscle group. The idea behind this test is to determine what load levels and repetitions you should be using during your time in the gym. Remember, our goal with strength training is to optimize your time in the gym to enhance your overall body strength as it relates to racing.

Together with your track and gym assessment numbers, you have the foundation to create your own individualized strength program. If you have questions about your testing results, please feel free to email the testing data to Robb at robb3@earthlink.net and he will provide you with some training protocols to enhance your strength program.

How do I **determine what muscles are weak?**

To keep things in perspective, we are analyzing the racers body in three planes:

- Front and Back
- Top and Bottom
- Left and Right Side

The more in balance we can keep the strength levels in the related muscle groups found within each of these two planes, the higher the overall strength levels. For example, we would like to see similar strength levels in the quadriceps (front of leg) and the hamstrings (back of leg) to avoid unnecessary strains around the knee. We would like to have the chest muscles as strong as the back muscles to avoid any strains to the shoulder capsule. Though there are typically some strength discrepancies amongst muscle groups (front and back of the body for example), we are constantly striving to develop functional integration of all muscle groups to avoid unnecessary injuries.

What muscle group do I need to work on in the gym?

The answer to this question is **ALL** muscle groups! If you can identify one muscle that is not used during a race, then you have found a muscle that you don't have to train during your strength workouts. From head to toe, we are looking to enhance your overall body strength. As a rule of thumb, the muscle groups that you identify as weak based on your load level calculations, need to be put under more load levels and lower repetitions than the established strong muscles (which would need moderate load levels and higher repetitions). Remember, once we get your weaknesses to match your strengths, then your overall program has risen to the next level of capability and performance potential.

What exercises do I need to complete in the gym?

At Coach Robb's, we see three key weak links in a racer's overall strength program:

1. Lack of core body strength
2. Lack of balance between prime movers and antagonist muscle (i.e. biceps and triceps in the arms and the quadriceps and hamstrings in the legs)
3. Lack of flexibility in all muscle groups

Human speed is all about the concept of pushing and pulling throughout the entire body while racing. Therefore, you need to address every muscle group from head to toe while in the gym. While in the gym, Coach Robb's prefers to use stretch cords and individual dumbbells for all strength work for one main reason – the solicitation and development of the stabilizer muscles around each joint verse the machine doing this work for you. Please consult a qualified personal trainer at your gym to help you determine which exercises you will be doing to develop strength and show you the proper form with all of your lifting exercises. Keep in mind that it is better to have quality lifting exercises than to have quantity. Also, don't be afraid to change up the program every four weeks to avoid getting bored and allowing the muscles to get stale with your program.

Hormone Imbalances & Body Symptoms

The first step in overall health and athletic capabilities, is understanding what hormones are and how to effectively adjust them with the utilization of raw foods and supplementation into your daily diet. By becoming a student of hormones, you will learn how to properly restore your optimal health and performance (athletically, mentally and physically). Within this article, we will discuss symptoms associated with hormone imbalances. In my opinion, Dr. Phil Maffetone has done a great job breaking down complex physiological principles associated with hormones into understandable segments. The following highlights are out of his book: The ***ABC's of Hormonal Stress***, please don't get bogged down with the terminology, but instead focus on the end results as it relates to you the individual and athlete.

The main hormones we will be discussing within this article will be cortisol, dehydroepiandrosterone (also known as DHEA), testosterone, estrogen and progesterone. Imbalances within these hormones can produce various signs and associated symptoms in your everyday life. First a little background on hormones. Hormones are produced from your head down, mainly by glands throughout your body (there are a few produced in organs). The process begins in the hypothalamus of the brain, which is frequently associated with the nervous system. The hypothalamus also produces certain hormones that affect the pituitary gland (also found in the brain) which send the hormone adrenocorticotropic hormone (ACTH) through the system to glands (i.e. adrenals) which in turn are stimulated to produce other hormones. This example is referred to as the hypothalamic-pituitary-adrenal axis. I realize all of that information can quickly become overwhelming, so take moment and re-read the entire paragraph and envision how the body produces and processes hormones.

Hormone production by specific glands comes and goes as needed by the body. Hormones are responsible for helping to regulate stress (in any form), body development, repair and growth. They are also instrumental in facilitating the utilization of sugar and fat for energy and regulating electrolytes and water during exercise.

HORMONE REFERENCE CHART

HORMONE	PRODUCTION SITE
Cortisol	Adrenals
DHEA	Adrenals
Testosterone	Adrenals, ovaries and testes
Estrogen	Ovaries
Progesterone	Ovaries
Insulin	Pancreas

Misc. Thoughts:

- DHEA can be converted to estrogen & testosterone
- In men, testosterone can be converted to estrogen
- The three major estrogens include estriol, estradiol and estrone

Both men & women make all three sex hormones - estrogens, progesterone & testosterone. The difference between genders is the amounts: women make more estrogens and progesterone and men make more testosterone.

As we review the various hormones and the affects on your body, the main hormone of review will be cortisol due to its presence associated with any stress (physical, chemical or mental) and how it influences numerous other hormones in your body. Clinical studies have illustrated that high levels of cortisol, the other hormones in your body become suppressed. As a result, a common situation (especially with athletes who train too hard and too long) of hormonal imbalance is high cortisol, accompanied with low DHEA, testosterone, progesterone and estrogen levels. When this imbalance presents itself, your body's ability to repair and rebuild itself is adversely effected. In the world of physiology, we refer to your body's conditioning in either an anabolic or catabolic state. When you are in an anabolic state, your body is rebuilding as an adaptation to training. It manifests itself in the way of stronger & leaner muscles, denser bones, increased blood vessels and enhanced immune system.

On the opposite end of the spectrum, you have what is referred to as catabolic physiological state. In a catabolic state, your body is breaking down at levels that are difficult to overcome due to high levels of stress and resulting hormone levels. When the body spends excessive amount of time in a catabolic state, injuries, illness and reduced performance levels are typical symptoms. If you were to have a blood sample drawn when these symptoms are present, you will find high cortisol and low DHEA along with low testosterone levels (in both men and women). In the world of athletic performance, when the athlete is in a catabolic state, the first noticeable characteristic is a reduction in performance. An additional characteristic is found within the mental performance realm in the form of poor memory, reduced concentration and even depression.

One little side note, most hormones within the body (with the exception of insulin) are manufactured from cholesterol. Many studies have illustrated that a low fat diet results in lower levels of some important hormones, with the exception of insulin which has been noted as increasing with a low fat diet.

Hormone imbalances result in a variety of symptoms, below are a few of the most common symptoms that Dr. Maffetone has experienced in his years of practice.

STRESS CYCLE: hormone imbalance is the result of and further provokes additional stress. Many healthy body functions, including brain function, begin to deteriorate.

REDUCED FAT BURNING / POOR WEIGHT REGULATIONS: the high cortisol and low DHEA levels imbalance causes your body to burn more sugar and less fat as a fuel, which in turn causes you to store more fat. Additionally, a low thyroid function is also common with this condition.

ATHLETIC PERFORMANCE: hormonal imbalances can push the body into a chronic catabolic state which will inhibit any physical recovery and ultimate improvement.

PREMENSTRUAL SYNDROME (PMS): thought to be associated with reduced progesterone, high cortisol, low DHEA and/or the combination of several hormone imbalances.

POOR RECOVERY: high cortisol and low DHEA levels (frequently low testosterone is present)

LOSS OF MUSCULAR STRENGTH AND BONE DENSITY: high cortisol and low DHEA levels along with low estrogen and progesterone in women/low testosterone in men.

AMENORRHEA: athletic women, who lack a menstrual cycle, are seeing a direct sign from their body that they are under tremendous amounts of stress (of any kind - personal, professional or athletic).

REDUCED IMMUNITY: as the body attempts to adjust to hormonal imbalances, the body becomes fatigued and susceptible of to infections from bacteria, viruses and fungal infections. Normally these symptoms are treated with antibiotics rather than addressing the cause of the problem (i.e. hormonal imbalance) and external stressors (personal, professional and/or physical).

MISC.: symptoms include insomnia, depression and eating disorders. Insomnia occurs when cortisol is too high during the night.

If you have any questions or need anything clarified, please email Robb at robb3@earthlink.net.