Excerpts from the "Rowing Stronger" E-Book and RowingStronger.com
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Rowing has a dozen training qualities all requiring precise planning and execution to develop, improve, and build to peak performance. I hope that this mini e-book helps shortcut some of the common mistakes and frustrations that I and many other rowers like you have experienced in our quest for optimal training!

What You're Getting Into

3,600 words, 20 minute read time. At the end of it, you'll know:

- What muscles are crucial for rowing performance as well as health and longevity
- How to train those muscles in the manner that will best translate to improved rowing ability
- Why strength training is such an important part of overall rowing training
- How to modify your training from season-to-season to build toward your peak performance goal

As a rower, I tried it all from bodybuilding and powerlifting programs to mimicking the routines of elite rowers to doing ultra-specific workout routines that I thought for sure would get me that next PR. My years of training, coaching, and refining my approach are written here now for you to get on the right track in the weightroom!

Happy training,

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The Top-Down Endurance System

"Strength endurance training without adequate strength only means you are getting better at being weak." Ed McNeely

For many endurance athletes, this is like that scene from "The Matrix" where Morpheus offers Neo the blue pill if he wants to stay in his own world of illusions or the red pill if he wants to learn what the world is really like.

What if I told you that doing dozens and dozens of reps "for strength endurance" isn't actually building strength OR endurance?

Simply put, the reps are too low to really be building endurance, but the weights are also too low to really be building strength.
We use the water, erg, and cross-training to build the foundation of endurance while using higher intensity strength training to build endurance from the top-down. The cardiovascular (CV) system is the foundation of endurance and develops faster than the muscular system. The muscular system represents the ceiling of ultimate ability, but takes longer to develop.

**The goal of the Top-Down approach is to improve the rower’s maximum force potential to make the force required from one rowing stroke a smaller percentage of their maximum force, and thus easier to endure for longer time and distance.**

Let’s assume that one stroke requires 300lbs (136kg) of force, about half of which will be produced by the legs, so one stroke would equate to roughly a 150lb squat. The most common "blue pill" way to increase rowing endurance at that intensity is by doing high-rep endurance sets of 20+ reps with 150lbs or even less.

By contrast, the goal of the top-down system would be to build high-end power from a junior rower’s squat max of 175lbs (150=85% of 175) to a university rower with a max of 315lbs (now 150=47%), WHILE continuing endurance work via hundreds or thousands of strokes per week on the water and/or ergometer.

**Endurance and strength thus develop in parallel over months and years to produce a more effective rowing stroke.**

The Top-Down Approach is especially important with athletes who have a young training age. "Training age" doesn't refer to chronological age, but rather the years an athlete has trained a given activity. If a rower arrives at college and has rowed since high school, their rowing training age might be five, but their weight-training age might be zero or one if rowing has been their sole activity. Many rowers, especially high school and college rowers, have not had a structured and sufficiently supervised weight-training program. The absolute last thing a new trainee should do is a program of high-rep isolation exercise circuits. Not only does this approach fail to teach the rower how to use the body and muscles in a coordinated way that will transfer to rowing, but the high volume inherent in light endurance circuits can cause overuse injuries and muscular imbalances. Additionally, a rowing team can have heights ranging from 5’3 females to 6’8 males, and a generic commercial exercise machine is not built for this range of athletes. This exposes athletes to further risk of injury with ill-fitting and ineffective machines that place tension on vulnerable parts of joints, muscles, and bones.
In addition to the physiological benefits of low-rep training compared to high-rep training (20+ reps), low-rep training allows an athlete to focus fully on executing every rep with proper form and power. Mental focus deteriorates in high-rep sets, which leads to ineffective low-effort training as well as potential for injury resulting from a breakdown in form. Performing powerful and accurate repetitions in the two-to-ten rep range yields the most benefit from each exercise, effectively and efficiently builds strength, and reduces the injury potential of longer, high-rep sets of 20+ reps.

The Top-Down Approach also reduces another chronic risk for rowers and endurance athletes—overtraining. Ask a rower what their typical week is like, and it’ll be at least 12 hours on the water or on the erg, 2-4 high volume lifting sessions (if any weight-room training is done at all), and 1-2 road/stair run conditioning sessions thrown in. This is a lot of mileage on the ankles, knees, and hips. Sitting in a boat or on an erg for 12+ hours a week, running, cycling, and lifting weights for high reps also causes postural concerns for the mid-back and shoulders. All of this training is then combined with student or full-time employee responsibilities of sitting down and studying, working, and commuting. Added all up, injury or sickness commonly results in the overtrained athlete whose body is unable to recover from chronic or escalating stress. Overtraining can also have a detrimental effect on performance, causing lack of motivation to train, decreased cardiac output, higher resting heart rate, and even depression-like symptoms at the acute level [2].

Rather than flail away on machine circuits and high-rep endurance sets, this system of strength training uses faster, more efficient, safer, strength-focused sessions to target exercises to directly improve rowing performance as well as exercises to prevent injury. These sessions consist of back and front squats for the legs, deadlift variations for the posterior chain muscles, overhead pressing for the shoulders and mid-back, barbell and dumbbell rowing variations for the back muscles, and assistance exercises for injury prevention and muscular balance.

Main work consists of strength or power work, using big compound muscle groups, to improve endurance over the long-term via the top-down strategy. Assistance work can then be used for secondary goals such as muscle size, strength, and injury prevention through isolation exercises for targeted muscle groups. Assistance work tends to focus on restoring the muscles that rowing fails to develop. There is much more detail on this in the Exercise Selection and Injury Prevention chapter, but lack of strength in the postural muscles is one of the main causes of the rowing hunchback—internally rotated “caveman” shoulders and the turtleshell mid-back. Sweep rowing causes even greater imbalances by putting greater reliance on one side of the body. The muscles of the inside arm and the inside leg are commonly under-developed compared to the outside arm and leg. It is imperative that these imbalances are
corrected to restore bilateral (left/right side) symmetry and avoid overuse injuries and complications later in life. One of the main benefits of a structured weight-training program is restoring balance to the muscular system by correcting bilateral asymmetries to prevent injury and maximize performance.

The single most important reason to weight train is prevention of injury. Immediate performance improvement is a distant second. This is contrary to the beliefs of most, but think about it. Does it matter how strong or how fast you are, or how great your endurance is, if you hurt too much to display it? What if you can out-run everyone on your team, but due to a shoulder injury, can’t row in the big race? What if you have the best technique in the boat, but can’t race or go 100% because of a hip injury? Weight-training can prevent muscular imbalances that lead to injury, which keeps athletes in the boat longer, providing more time to practice form and gain opportunities to improve in the sport, which can earn a longer, healthier, and more successful career.

Ready? Read on for how we accomplish this.
Periodization sounds like a big intimidating concept, but it simply means organizing one’s training to prioritize certain qualities over others at different times of the year. Check out the graph above for an illustration of how it works.

The advantage of periodization, rather than "everything-at-once-ization," is the ability to focus on developing specific qualities to build to a championship performance. Strength, endurance, power, technique, and balance are all important factors in a rowing program and it is impossible to train all to their full potential simultaneously. Periodization provides the answer for how to get the most out of each training variable and apply it to race season.

With this philosophy of using the weight-room to train for strength and power and the water and erg to train for endurance, we use the “main work” of each session to train the primary objective of each training block. These exercises are usually squats,
front squats, deadlifts, and/or overhead presses, and are usually done for multiple sets of low reps at at least 65% of the lifter’s one-repetition maximum.

"Main work" is used to train the primary objective of each training block. These exercises are usually squats, front squats, deadlifts, and/or overhead presses.

“Assistance work” is then performed after the main work.

**Assistance work has two important purposes:**

First, to build the main work lifts with close variations to improve specific strength for rowing performance. This may include front squats, Romanian deadlifts, dumbbell presses, and other exercises to improve muscle strength, size, and performance.

Second, to reduce risk of injury. Rowers who do not strength train are very likely to develop movement and muscular imbalances. Common imbalances from sweep and scull rowing include: quadriceps-dominance, gluteus muscle weakness, hip flexor tightness, thoracic kyphosis (rounded upper back), internally rotated shoulders, and restricted movement to their non-stroke side.

These imbalances result in poor movement efficiency, which means slower times and dampened performance, as well as a variety of short and long-term aches and pains and increased risk of injury. We can improve performance and reduce risk of injury with targeted assistance exercises focused on the movements and muscles that rowing fails to develop: the gluteus muscles, thoracic extensors, shoulder stabilizers and external rotators, and upper body pressing muscles.

Because assistance work is consistently focused on building the lifts and reducing risk of injury throughout the year, the rest of this article will discuss how to manipulate the main work of each session to achieve the goals of the training block. You should follow the main work program with assistance exercises focused on building the lifts and restoring muscular balance in the muscle groups listed above. We typically perform 2–4 sets of 8–15 reps per exercise on these exercises, and I like to use a variety of exercises to keep things challenging mentally, muscurally, athletically. Bodyweight, kettlebell, dumbbell, resistance band, unilateral (one arm or leg at a time), and free weight exercises can all be great for improving strength, muscle size, movement quality and coordination, and reducing risk of injury.

Before starting any strength training program, get instruction from a qualified coach or personal trainer. Performing exercises correctly and confidently will help you get the most out of your program and reduce your risk of injury. I always say that getting strong is a secondary goal to getting healthy. Being a weight-room hero doesn't earn
you any honors if you can't row because of injury.
The block periodization system is built around four blocks of training. In each block, you focus on building one quality while maintaining another quality. This lines up perfectly with the standard 2k rower's training and competitive schedule, so read on for the details of each block of training.

The Blocks at a Glance

**Preparation Block**
- **Block #1: General Preparation**
  - High volume, low specificity
  - Build aerobic and muscular base
  - Cross-Training

**Pre-Competitive Block**
- **Block #2: Specific Preparation**
  - Moderate volume, moderate specificity
  - Build aerobic and muscular base
  - Longer distance rowing
  - These blocks lay the foundation of the rest of the year's training.

**Competitive Block**
- **Block #3: Pre-Competitive**
  - Moderate volume, high specificity
  - Build peak power
  - Start race prep for main season

  - This is the block where you turn up the heat!
  - Get ready for race season by building strength and peak power to propel you through the competitive season.

**Competitive Block**
- **Block #4: Competitive**
  - Low volume, high specificity
  - Maintain power
  - Prioritize race performance
  - Taper for championship race

  - It all comes together in the Competitive Block. All the strength, endurance, and power from the previous three blocks culminates NOW when the racing season is on the line and every inch counts.
The Preparation Block

There are two blocks within the Preparation Block, General and Specific.

Block #1. General Preparation

12-16 weeks before start of fall season

Primary focus: Base-building, muscular balance and hypertrophy

Secondary focus: Strength

Sport focus: Cross-training and aerobic base

Athletes coming off a hard competitive season are often fatigued and possibly carrying aches or minor injuries. The goal of this training block is to build a foundation for future training. We focus on restoring muscle balance, building some muscle mass, and building a great strength and aerobic base. Main work strength training typically consists of approximately 3-5 sets of 6-12 reps in the 70-85% intensity range. We’ll do 2-4 strength training sessions per week and 3-4 aerobic workouts per week of 60 minutes or less, usually cross training with cycling, sculling, running, and/or erging. It’s also great to play another sport during this time to build aerobic base and athleticism and take some time away from rowing. I’m a big fan of multi-sport athletic development.

Block #2. Specific Preparation

8-10 weeks of fall head racing season

Primary focus: Strength

Secondary focus: Muscular balance and hypertrophy

Sport focus: Technique and specific base

Although most rowers will return to rowing in the fall, I consider the fall season an extension of the off-season for the competitive spring 2k rower. On-water workouts
during this time tend to be focused on longer distances to continue to building aerobic base and refining rowing technique in the boat. In the weight-room, we use this time to integrate new rowers and continue building the strength and size that will last use through the spring season. Drop to 2-3 strength training workouts to accommodate for the increase in volume from on-water practice, but keep the workouts much the same as the General Prep phase. We continue to focus on building strength in the 70-85% intensity range for 3-5 sets of 6-12 reps per main work exercise. It is vital to get the most out of your Preparation blocks to build the foundation of training for the rest of the year.
Block #3. Pre-Competitive

8-10 weeks of winter, before spring season

Primary focus: Power

Secondary focus: Strength

Sport focus: Anaerobic base

Now it’s time to tune up the base strength we built in the previous blocks into boat-moving power! 2-3 weight-training workouts per week focusing on the 70-85% range, but using fewer reps to maximize speed and power output. Main work usually consists of 5-8 sets of 2-3 reps performed with maximum explosive intent for power development. This is key—even though the intensity stays the same, the fewer number of reps and full explosive intent will help convert your strength gains to power production. This is also the last chance to really build strength before going into the strength maintenance cycles of the spring competitive season.

In a 2009 article, renowned strength coach and Rowing Faster contributor Ed McNeely posited that aerobic fitness becomes less of a limiting factor and more of a baseline standard for rowers as rowing’s competition level increases and talent pool widens. In the world of competitive sports, the game-within-the-game is how to gain a lawful edge over your opponents in training or competing. According to McNeely, excellent aerobic fitness has lost that edge and is now just a baseline requirement for competitiveness in the sport. McNeely cites several studies that support his claim that, “outside of technique, the one physical factor that
is emerging as being the best predictor of rowing performance is peak power.”

READ MORE: Peak Power Training for Rowing
Block #4. Competitive I

First 5-6 weeks of spring season, until 2 weeks away from our first major regatta

Primary focus: Health and Recovery

Secondary focus: Power

Sport Focus: Race Prep

During this time, everything in the weight-room is done with preserving the rowers’ energy for practice in mind. Strength training workouts again drop to 2 per week, often using the one-heavy/one-light approach, and we reduce volume as well to 3-5 sets of 1-3 reps in the 70-85% rep range with full explosive intent. The whole focus is being ready to practice at full intensity, so I avoid programming any fatigue-heavy training such as higher rep sets (6+ reps) on main work. I also prescribe more active recovery work during this time, such as foam rolling, stretching, and other exercises to help my athletes feel better for the next day.

Do not stop weight training when your season begins. This is a mistake I commonly see with many athletes. If you stop training at the start of your competitive season, you are your strongest at the start of the season when it matters least and weakest at the end of your season when it matters most. Do not make this mistake—just learn to adjust your training volume to manage fatigue!

Block #5. Competitive II/Taper

Final 6-8 weeks of spring season, major regattas to conference/Nationals

Primary focus: Health and Recovery

Secondary focus: Maintain strength through the taper
Sport Focus: Race Readiness

All of our focus is now shifted toward performance at regattas. Strength training workouts are not fatigue-inducing and are geared entirely toward maintaining our gains from the previous 4 training blocks. During the final 6-8 weeks of the season, we will only do 3-4 workouts above 85% intensity, spaced out such that we maintain strength throughout the season while coming to each important regatta fresh and recovered. I suggest twice per week lifting, usually Monday/Wednesday to maximize performance for a Saturday regatta. Aside from the 3-4 85% intensity workouts, other lifting sessions are comprised of no more than 3-5 sets of 1-2 explosive reps in the 65-75% intensity range. You will be surprised at how much strength and power you can maintain during this time as long as you are putting full explosive intent into each main work rep. Because our rowers train through spring season, we arrive at our peak regattas just as strong as when we started the season, with the added benefit of removing the fatigue from the rest of the season to peak for our final races. The taper strategy relies on the concept of Residual Training Effects as outlined in *Block Periodization Vs. Traditional Training Theory* by Issurin, which suggests that maximal strength can be maintained for 21-28 days. Using this concept, plan for one 85% weight-training session at least once every 3 weeks, planned at a time that does not conflict with a major regatta, and you will maintain your strength through the late spring season.
Rather than following the fall-winter-spring-summer model of the spring rower, the model would likely be as follows for a fall head race rower:

General Prep Block (winter)
- Weight-training (primary) focus: Base-building/hypertrophy
- Maintain (secondary focus): Strength
- Rowing focus: General aerobic conditioning

Specific Prep Block (spring)
- Weight-training (primary) focus: Strength
- Maintain (secondary focus): Base-building/hypertrophy
- Rowing focus: Specific aerobic conditioning

Pre-Competitive Block (summer)
- Weight-training (primary) focus: Power
- Maintain (secondary focus): Strength
- Rowing focus: Anaerobic conditioning

Competitive Block (fall)
- Rowing focus: Race performance
- Maintain (secondary focus): Power

The concepts of each block and transitions between blocks still applies just the same between 6k and 2k rowers, but distance athletes may wish to employ slightly lower volume of weight-training to accommodate a higher volume of rowing training. In a head race, the overall importance of endurance versus power shifts more toward the endurance side of the spectrum. Strength and power is still important. Because your rowing training will likely be higher volume and lower intensity to train for more on-water endurance, your strength training should actually be further toward the
strength side of the spectrum. The Pre-Competitive block would therefore be slightly more strength focused and slightly less power focused, concentrating more on the 75-85% intensity range and less on the 60-75% intensity range. This stays consistent with the top-down endurance approach while adjusting weight-training to accommodate higher volume water and ergometer training. This concept is also commonly referred to as “polarized training,” which means spending a vast majority of training time at a sub-maximal intensity level, then performing the other portion of training at closer to maximal intensities above race pace.

For the endurance rowers who might have a hard time making this mental shift from weight-room endurance training, consider this. How many strokes a week do you take in training preparing for a 6k+? If rowing training is so focused on longer pieces and endurance, exactly how many reps would you have to do in the weight-room to see carryover to rowing endurance? With approximately 600 strokes in a 6k piece, do you do three sets of 200 in the weight-room to build endurance for this? My philosophy is that it is much more effective to train for strength and injury resilience in the weight-room, aiming for a downstream effect on endurance, and leave the water and the erg to developing endurance specific to your sport.

The taper would also be shorter in length, since distance racing relies more on aerobic system endurance and less on anaerobic power than a 2k race does. Aerobic fitness has a much shorter residual than strength and is more fatigue-resistant, which means it can withstand greater training volumes and levels before seeing performance decrements. A taper for the endurance athlete should be no more than 14 days, and likely more like 5-7 days for the athlete training 10-15 hours a week. Strength training should be low-volume strength maintenance during the competitive season anyway, so this would simply mean scheduling the last strength-training session about 7-10 days before the major race, allowing strength to rebound for full recovery.

Even though the performance effects of strength training may be less pronounced in long distance racing, a year-round approach to strength training is still vital for long-term performance and injury resilience. If anything, a higher volume of rowing training on-water or on-erg to prepare for endurance racing means a higher injury risk from overuse and imbalance without a sound strength training approach. Keep your strength and power training in the weight-room short and relatively low volume, build up your muscular balance and movement quality through assistance work, and enjoy the results of your training!
My Youtube channel contains a free exercise guide of 40+ different exercise demonstrations and coaching cues.

www.youtube.com/c/strengthcoachwill

- Squat: Front squat, back squat, goblet squat, single-leg squat, reverse lunge
- Deadlift: Conventional, block pull, Romanian deadlift, deficit deadlift
- Press: Strict overhead press, push press, dumbbell presses
- Bench: Pushup, conventional, incline, dumbbell, floor press
- Pulls: High pull, chin/pull-up, batwing row, barbell/dumbbell row, inverted bodyweight row, x-band row, landmine row, renegade row
- Shoulder prehab: YWT raises, face pulls, band pullaparts
- Core: Pallof press, lying pallof press, plank
"Rowing Stronger" is 75 pages jam-packed with specific exercise prescriptions, sample annual periodization template, information for lightweights, masters, and youths, sample program, detailed guide to tapering, and more. Click the link to read the first chapter for free and get started!

https://rowingstronger.com/book/