



Advanced Rowing Strength Training

Achieving the next level of performance

Will Ruth

Green Racing Project Strength Coach

BS Kinesiology | MA Sport Coaching | NSCA-CSCS

Review of the Basics

1. Move better → Get stronger → Lift faster → Strain harder
 - a. Efficiency beats output
 - b. Technique needs to be precise and repeatable

2. Strength training is not the sport itself
 - a. Efficiency paradox: Lose-lose
 - b. Sport competition → Sport training → Sport drills → Erg → Strength training

Specific Considerations for “Advanced”

1. Opportunity costs: time, energy, recovery
2. Point of diminishing returns
3. Availability > Ability
4. Individualizing training

Why make time for strength training?

Force development: Slower than sport movement

Power development: Heavier than sport movement

Muscular development: Longer ROM + mechanical stress + eccentric tension

Movement corrective: Much easier to alter movement patterns in stable gym environment than sport environment, THEN work to bridge the two

Physical activity for life: Can be done anywhere for health benefits beyond

Strength-Power Relationship

Force = Coordination, muscle fiber size, neural drive

Strength = Force development: $f = m \times a$ (mass)

Power = Rate of force development: $p = f \times v$ (time)

Endurance = Powerful force over time (efficiency)

Coordination → Muscle/Strength → Power → Endurance

 strength →  % max effort →  submax endurance (performance)

Key Questions

What does the sport
overtrain?



Avoid or minimize impact

What does the sport
require?



Enhance to improve
performance

What does the sport
neglect or undertrain?



Address to fill this gap

Good strength training should...

Strength Training for Sport + Beyond

1. **Improve performance:** Enhance physical capacity to be just beyond the needs of the sport.
2. **Reduce risk of injury:** Training movements and muscles that the sport training neglects.

#1 and #2 are mutually reinforcing!

3. **Be more than the sport:** Physically active for life.

Fundamentals Still Matter

Fundamental Movements: Squat, hinge, push, pull

Bilateral AND Unilateral: Specific power AND muscle balance

Technique, Tempo, and ROM: One improves the next

80/20 Principle: 20% of details becomes more important

More Advanced: Plyos, shoulders, hips, and core

Training Session Template (2x/wk)

Day 1

Full-Body Warmup

A1. Plyometric (Jump/Throw)

A2. Squat

B1. Horizontal Push (eg. pushup)

B2. Horizontal Pull (eg. row)

B3. Posterior Chain (RDL/NHC/GHR)

C1. Lateral/Rotational Hip

C2. Shoulder

C3. Core

~10 mins to prepare

← **Power/coordination (3-6 x 2-4 reps)** →

← **Power/strength (3-5 x 3-8 reps)** →

← **Muscle/balance (3-4 x 8-15 reps)** →

← **Fill sport gaps (2-4 x 10-20 reps)** →

Day 2

Full-Body Warmup

A1. Plyometric (Jump/Throw)

A2. Hinge

B1. Overhead Press (eg. 1-arm DB)

B2. Vertical Pull (eg. chin-up)

B3. Single-Leg Squat (lunge/RFESS)

C1. Lateral/Rotational Hip

C2. Shoulder

C3. Core

Plyometric Exercises



**2-Leg
Vert/Broad**



**1-Leg
Vert/Broad**



**Backwards
Overhead**



**Forwards
Overhead**



Slam

Plyo Power Factors

ORIGINAL RESEARCH article


Front. Sports Act. Living, 03 December 2020

Sec. Elite Sports and Performance Enhancement

Volume 2 - 2020 | <https://doi.org/10.3389/fspor.2020.589013>

Technical Determinants of On-Water Rowing Performance

 Ana C. Holt^{1,2*}  Robert J. Aughey¹  Kevin Ball¹  William G. Hopkins¹

 Rodney Siegel^{1,2,3}

¹ Institute for Health and Sport (IHes), Victoria University, Melbourne, VIC, Australia

² Sport Science Department, Victorian Institute of Sport, Melbourne, VIC, Australia

³ Australian Institute of Sport, Canberra, ACT, Australia

Time to Peak Force

M1x: 0.43s

W1x: 0.39s

M/W2-: 0.36s

“Rower force development should be prioritized as a key component of power output and boat velocity.”

[Technical Determinants of On-Water Rowing Performance \(2020\)](#)

Shoulder Exercises



Facepull



Pullapart



Kneeling Shoulder Raise

Hip Abduction Exercises

Side-Lying Abduction



Glute Marching

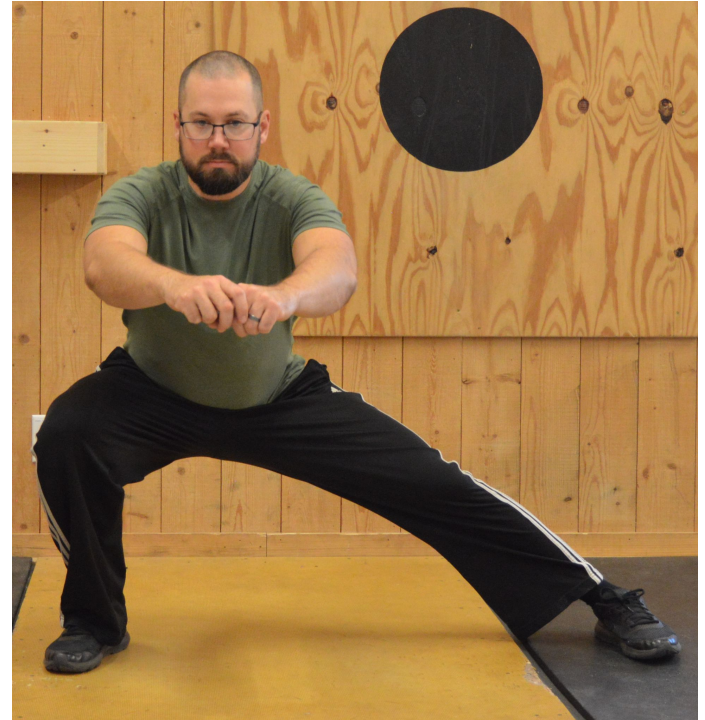


Mini Band Walk

Hip Adduction Exercises



Copenhagen Plank



Lateral Lunge

Hip Extension-Knee Flexion Exercises



Nordic Hamstring Curl



Glute-Ham Raise

Core Exercises



Seated Rockback



Coach breathing
with stroke rhythm!



Ring/TRX Exercises

How much weight to lift?

Percent 1RM (%1RM)

Rate of Perceived Exertion (RPE)

Velocity Based Training (VBT)

Prescribing Training Load: %1RM

> [Biol Sport](#). 2014 Jun;31(2):157-61. doi: 10.5604/20831862.1099047. Epub 2014 Apr 5.

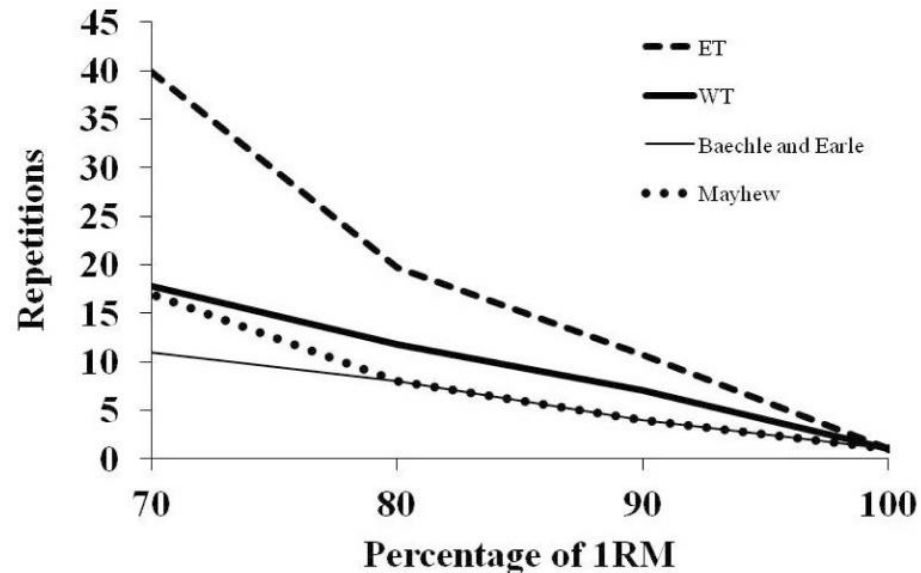
The relationship between the number of repetitions performed at given intensities is different in endurance and strength trained athletes

B Richens ¹, D J Cleather ¹

Male collegiate athletes

8 weightlifters and 8 runners (>800m)

Leg press



Prescribing Training Load: %1RM

> [J Strength Cond Res. 2010 Feb;24\(2\):394-400. doi: 10.1519/JSC.0b013e3181c7c72d.](#)

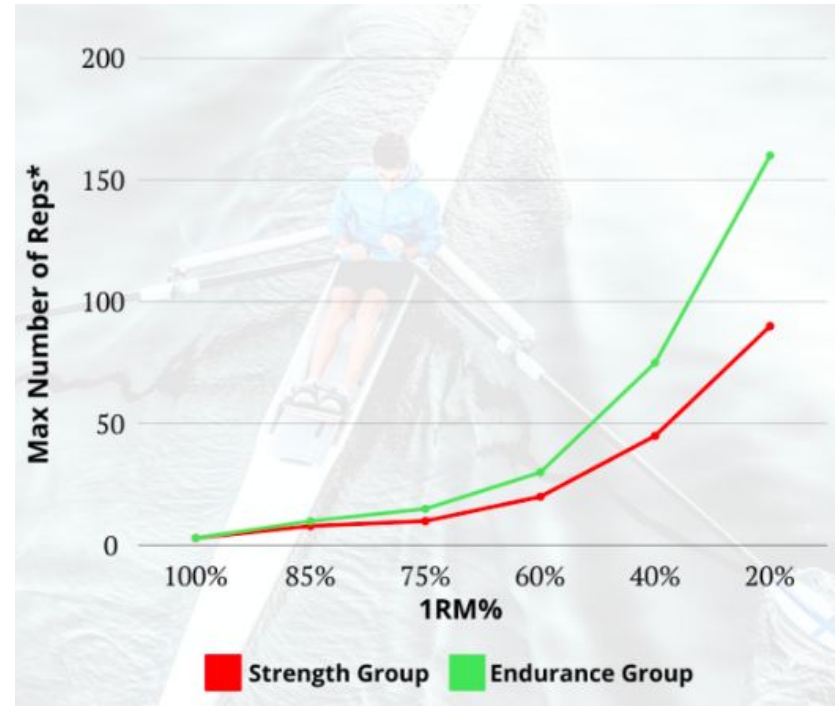
Local muscular endurance and prediction of 1 repetition maximum for bench in 4 athletic populations

François D Desgorces ¹, Geoffroy Berthelot, Gilles Dietrich, Marc S A Testa

Male collegiate athletes

Strength group = powerlifters/ball sports

Endurance group = swimmers/rowers



Prescribing Training Load: RPE

Communication system

Technical vs. muscular failure

Autoregulate based on fatigue

Rating	Description of Perceived Exertion
10	Maximum effort
9	1 repetition remaining
8	2 repetitions remaining
7	3 repetitions remaining
5-6	4-6 repetitions remaining
3-4	Light effort
1-2	Little to no effort

Adapted from [Helms et al. \(2018\)](#)

Prescribing Training Load: VBT

3-Zone Velocity-Based Training

	MAX STRENGTH	ACCELERATED STRENGTH	SPEED STRENGTH (POWER)
Meters per second	0.25-0.5m/s	0.5-0.75m/s	0.75-1.0m/s
Training Intent	Max force production	Base strength development	Rate of force development
Training Phase	Off-season (if at all)	Year-round	Pre-season/ In-season



Prescribing Training Load: VBT



< Back

FRONT SQUAT



Set: 7	Weight: 195.00 lb	MV: 0.42 m/s	Fatigue: 4%		
1	0.45 m/s	0.64 m/s	390 W	27.0 in	209.05 lb
2	0.38 m/s	0.59 m/s	330 W	27.3 in	199.67 lb
3	0.43 m/s	0.66 m/s	373 W	27.5 in	206.28 lb
Set: 8	Weight: 205.00 lb	MV: 0.41 m/s	Fatigue: 16%		
1	0.45 m/s	0.68 m/s	410 W	27.5 in	219.77 lb
2	0.40 m/s	0.72 m/s	365 W	27.2 in	212.64 lb
3	0.38 m/s	0.58 m/s	347 W	27.8 in	209.91 lb
Set: 9	Weight: 215.00 lb	MV: 0.34 m/s	Fatigue: 17%		
1	0.35 m/s	0.55 m/s	335 W	27.4 in	216.00 lb
2	0.36 m/s	0.78 m/s	344 W	27.9 in	217.36 lb
3	0.30 m/s	0.59 m/s	287 W	27.5 in	209.41 lb

Prescribing Training Load: VBT

“Unchains” athlete from fixed weight

No need for maximal testing

Autoregulate based on fatigue

Quantifies “specific strength” with a rate of force development

Safeguards athlete from overtraining, excess strain, technique breakdown

Investment ~\$400/unit

Athlete dependency on technology

Downsides of surveillance technology

Still need to program, coach, interpret!



WHEN we strength train

Ideally year-round (periodization = changing emphasis)

Ideally 2-3 times per week (45-60')

Ideally 6+ hours away from aerobic/sport training

- Plan A: AM/PM or different days
- Plan B: Strength before sport (with a few adjustments)
- Plan C: Sport before strength (with more adjustments)

Periodization Model Overview

# of Phases					
Two	Off-Season	In-Season			
Three	Off-Season	Pre-Season	In-Season		
Four (Off)	Early Off	Late Off	Pre-Season	In-Season	
Four (In)	Off-Season	Pre-Season	Early In	Late In	
Five	Early Off	Late Off	Pre-Season	Early In	Late In

Four-Phase Model (Collegiate)

Early Off-Season

Very reduced sport training

Nearly all strength/x-training

- + volume
- + frequency
- - intensity
- ++ variety (no specificity)

Late Off-Season

Reintroduce sport training

Strength + slightly less x-training

- = volume
- = frequency
- + intensity
- + variety (- specificity)

Four or Five-Phase Model (GRP)

Early In-Season

Includes train-through races

More moderate strength training

- = volume
- = frequency
- = intensity
- + specificity (- variety)

Late In-Season

Use residuals for tapering

Extreme departure from routines

- - volume
- - frequency
- - intensity
- ++ specificity (no variety)

Additional Phases

Rejuvenation: 2-4 weeks after conclusion of season

- No structured training, recreational physical activity only

Return-to-train: Departures from routine and/or return post-departure

- Training camps or returning from vacation, deload, injury, illness, etc.
- Rapid progression = single greatest risk of non-contact injury
 - 1:1 away-to-return time
 - 50/30/20/10 rule

More About Strength Training

Email: rowingstronger@proton.me

www.RowingStronger.com

Youtube: [@rowingstronger](https://www.youtube.com/@rowingstronger)

The “Rowing Stronger” book (\$30)

