

Strength & Conditioning for Rowing



3 Month Programme



2000m RACE



3-4mins

6-

1000-1500N

500-700N

>650W

START :
Power &
Max
strength

RACE PACE:
Strength
Endurance
Posture
Endurance

FINISH:
Power

In male world-class rowers, the power that is applied to the boat averages about 500-700N for a 6-min event, but may be as high as 1000-1500N for the first five strokes (Steinacker, 1993). Females will be at the lower end of this scale and lower for university rowers.

The Rowing Stroke

1. CATCH



Knee joint opens

- **quadriceps**
- **femoris,**
- **gluteus maximus**
- **gastrocnemius**

CONCENTRICALLY
Triple Extension

Trunk and upper body braced

- **Latissimus dorsi**
- **upper and lower back,**
- **shoulders and arms**

ISOMETRICALLY

2. EARLY DRIVE



Concentric actions
continue

Posture & Core Strength

- **Thoracic and lumbar spine**

ISOMETRICALLY

The Rowing Stroke

3. MID DRIVE PHASE



Hip Extension

- **hamstrings**
- **gluteus maximus**
- **lower back**

CONCENTRICALLY

Shoulder extension to neutral

- **posterior deltoid,**
- **Latissimus dorsi**
- **triceps brachii**

CONCENTRICALLY

4. FINISH



Elbow flexion

- **biceps brachii**

CONCENTRICALLY

Trunk stabilisation

- **rectus femoris**
- **tibialis anterior**

ECCENTRICALLY

INJURY: Lower back overuse injury most prevalent (Smoljanovic et al., 2009)

Elite vs Non Elite

Rowers who sustain greater propulsive forces (strength) achieve faster boat speeds (Lawton et al. 2011)

Better non-elite oarswomen produced greater leg extension power across a spectrum of loads (17.5% greater power at 50% 1RM) than weaker controls (Lund et al. 2006)

Dutch Olympic vs National vs club level male rowers of similar size and age: Olympic rowers were the strongest during an isometric rowing test, followed by national then club rowers. Olympic rowers also performed better on arm pull, back extension, leg extension and trunk flexion tests (Secher, 1975).

Annual Plan including Racing Timetable

Time of Season:	Sep - Nov	Dec - Jan	Feb - March	Late March - April	May - July
Duration:	2 - 3 months	1 - 2 months	1 ½ months	1 ½ months	3 months
Competition Timetable:	Pre season British Championships	Western Head	WEHoRR (11th march) (6km)	SPR Reg/Scot Unis (22rd April - prep for bucs) BUCS Regatta (29th April) (2km)	Scottish Boat Race Scot Champs HWR HRR HIR
Area of Focus:	Mobility AAA tests Strengthening weaknesses / injury prevention Conditioning Unilateral movements	Strength endurance General prep Hypertrophy Correct movement patterns (Circuit training)	Max strength Intro to clean Pushing loads Small taper for WEHoRR Upper Body Strength and Core	Max Strength Progressing to full clean Introducing power training into warm up / before main lifts	Cyclic work of max strength (maintenance), power leading into comps, conditioning and tapering
General Loading Patterns (Bird et al. 2005)	Load: BW Reps: 15+ Sets: 1-3 Rest: 60s	Load: <80% 1RM Reps:12-15 Sets: 4-6 Rest: 90s	Load: >85% 1RM Reps: 3-8 Sets: 3-5 Rest: 3-5mins	Load: >90% 1RM Reps: 3-8 Sets: 3-5 Rest: 3-5mins	



3 Month Aims

1) Increase **maximum strength (full body)**

- As a result, increase power (include small amount of power specific training)

2) Create a robust athlete to withstand the training load.

- Increase **upper body and core strength**
(minimise injury and help to maintain technique)

Strength goals from data collected over 10 years

Table 2
Strength to Body Weight Factors for Women

	High school (<i>n</i> = 166)	U23 (<i>n</i> = 97)	Club (<i>n</i> = 146)	National (<i>n</i> = 48)	Olympic (<i>n</i> = 31)
Squat	1.0	1.0	1.25	1.4	1.6
Deadlift	0.8	1.0	1.25	1.4	1.6
Bench Pull	0.6	0.8	0.95	1.1	1.2

Programme is for a **University level female rower**

McNeely, E (2001)

1RM Testing

Date: 14th & 16th February 2017

Week 1 (70kg Female)	
Exercise	1RM
Hang clean	40kg
Back Squat	70kg (1.0)
Pull Ups	3
Deadlift	80kg (1.14)
Leg Press	5 RM = 85kg
Bench Pull	50kg (0.71)

Core Tests (holds)		
Exercise	Max (mins)	GB Target (U23)
Prone	2.5	3
Supine	1	3
Lateral (L)	2	3
Lateral (R)	2	3

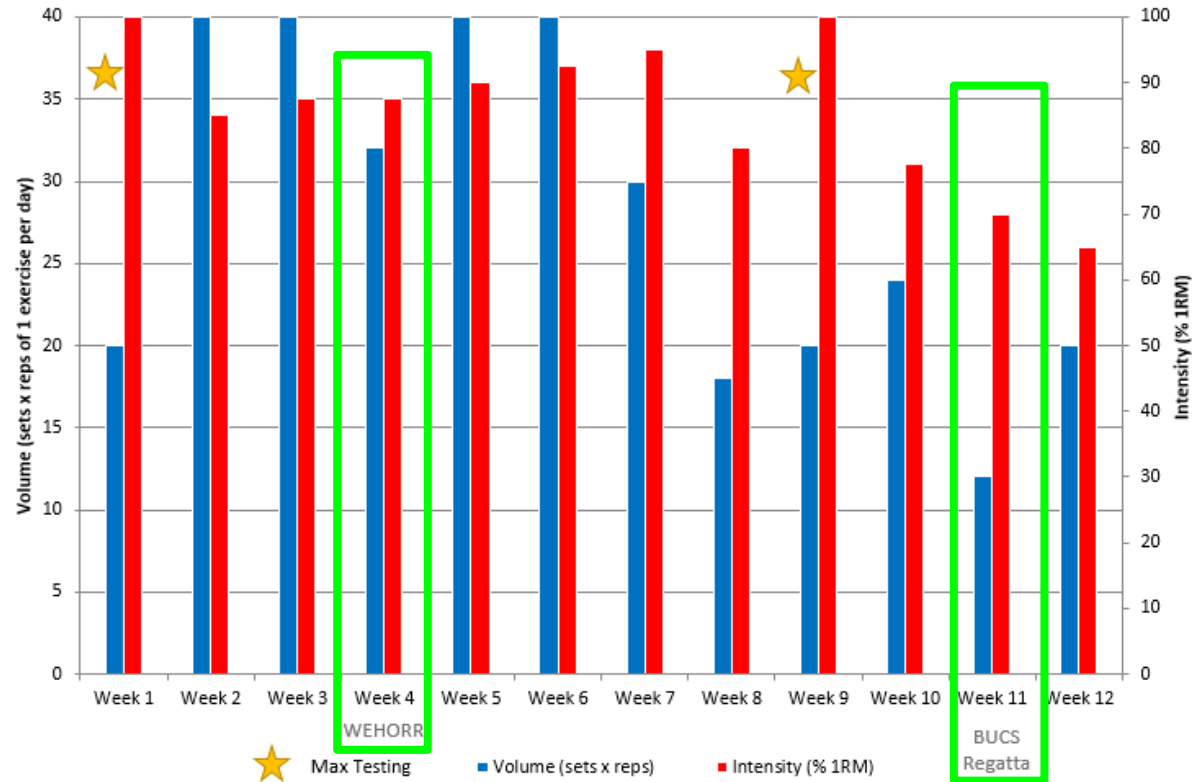
Own time 10 stroke maximum power on ergometer:
Peak power: 525W Free rate
GB U23 Target: 650W Free rate

Repeat Testing: 11th & 13th April
(Week 11)

Weekly Timetable

<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>	<i>Saturday</i>	<i>Sunday</i>
	6.30am	6.30am	6.30am	6.30am	8am	8am
Off	S&C (Main lifting work)	Rowing machine (endurance)	S&C (Main lifting work)	S&C (conditioning -upper body - core)	Water (hard)	Water (hard)
Own Time	5.30pm	2pm	5.30pm	Own time	12noon	12noon
Off or recover session (40mins light CV and stretch)	Rowing machine (hard)	Water (hard or endurance depending on weeks loading)	Rowing machine (hard)	Cross Training (60mins)	Water (tech/ endurance)	Water (tech/ endurance)

Loading Pattern



Session Plan 1.



1. 10mins of dynamic stretching and foam rolling (Limber 11)
2. **Mobility and Activation**
 - Overhead squat and press with broomstick (10)
 - Pistol Squats (5 EL)
 - Single leg SLDL (10 EL)
 - Monster band walks (F, B, S, S - x10 each)
 - Glute Bridge (10)
 - Hanging scapular engagement (5 + 5s hold each)
 - Internal arm rotation with band (10 EA)
 - External arm rotation with band (10 EA)

Date: Tuesday 28th March, Week 7 (2 hour session time)

Aim: Max Strength continued

- Decrease repetition number to increase loading
- Introduce Full Clean - decreased load for technique

3. Main Lifts

Tuesday (6.30am)		Week 7 (intro full clean, tech)			
Category	Exercise	Sets	Reps	Load	Rest
Clean	Full Clean	5	3	80	240
Lowerbody	Back Squat	5	3	>90	240
Upperbody	Pull Ups	4	6	BW	240
Upperbody	Bench Press	5	3	>90	240
Lowerbody	SLDL	5	3	>90	240
Core	Prone hold	2		1min	15
Core	Supine hold	2		1min	15
Core	Lateral hold	2		1min	15
Core	Lateral hold	2		1min	15
Core	Russian Twists	1	75	BW	

4. Accessory Movements

- Supine Row (3 x 8)
- Double leg stand from sitting on a bench in full hip flexion (braced position) (3x8)

Tempo
1:1:1

5. Stretch and Roll

Session Plan 2.



1. 10mins of dynamic stretching and foam rolling (**Limber 11**)

2. Plyometric / Ballistic Power

- Hurdle jumps (3x10)
- Step up and jump (3x10 EL)
- Medicine ball Slams (3x10)
- Medicine ball side throws (3x10)
- 10 Stroke Max on rowing machine (x3)

Tempo:
Explosive

Date: Thursday 27th April, Week 11 (2 hour session)

Aim: **Taper** leading into BUCS regatta (29th April)

- Low volume, medium load, move it as quick as they can.
- -Plyometrics included in mobility, before main lifts.

3. Main Lifts

Thursday (6.30am)					
Category	Exercise	Sets	Reps	Load	Rest
Lowerbody	Deadlift	3	2	70	240
Lowerbody	Leg Press	3	5	60	240
Lowerbody	Glute Bridge	3	2	70	240
Upperbody	Bench Pull	3	6	60	240
Upperbody	Overhead Press	3	2	70	240
Core	Roll outs	3	8	50	180
Core	Side Plank Knee Touches	2		1min	30
Core	Side Plank Knee Touches	2		1min	30

4. Accessory Movements

- DB front, catch position and lateral raise (1 x 8 each)
 - Nordics (3x8)
- Tempo = 1:1:1