STROKEARCS

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TABLE OF CONTENTS

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OVERTRAINING

FAILING TO ADAPT TO TRAINING

"*If you are tired, you are not in shape; if you are not tired, you have not been working hard enough.*" – Anonymous

Introduction

Successful adaptation to training is necessary to ensure better competitive performances. This adaptation is based on the athletes physiological and psychological responses to four important training factors; type, frequency, duration and intensity of exercise and, unless these factors are managed carefully, they can lead to failing adaptation or overtraining syndrome. The coach must offer a special blend of these factors at critical periods during the training process in order to achieve improved training and competitive performances. This blend is especially difficult to mange for crews as the boat is only as strong as the weakest link. So in the process of training, one of your athletes may tolerate the work very well, while another falters under the load.

Failing to adapt to training has some major physiological and psychological consequences, all of which lead to increasingly poorer training and competitive performances. It is difficult to design optimal training programs for everyone in the crew and, although some coaches employ a sound scientific approach in developing training programs many still base their training programs on intuitive ands empirical judgments with "more" and "harder" being the most important descriptive criteria. T is difficult to assess the relative impact on the athlete and there seems to be no specific preliminary symptoms to war the athlete that they are failing to adapt. By the time that failing adaptation has been recognized, it is usually too late to effectively reverse the condition and the athlete's only option is weeks or months of reduced training or complete rest; this could mean the end of high level competition for that year.

A critical aspect of failing adaptation is that it is often your most highly skilled and motivated athlete who is susceptible to failing adaptation. Athletes, who are excessively aggressive, always trying to perform at their best, are more critical of themselves than others, have set extremely high standards, want to win at all costs, genuinely believe they are physically indestructible, and can't seem to get enough work, must be observed carefully by the coach and perhaps more strictly controlled.

Failing adaptation is difficult to define and even more difficult to measure and prevent. The following discussion will likely ask more questions about this conversational topic than provide answers.

Symptoms

Symptoms of failing to adapt to training vary among individuals but the most common general feeling is one of heaviness in the muscles. This is usually accompanied by a gradual deterioration in training and competitive performances.

It is difficult to distinguish between failing to adapt to training and chronic fatigue resulting from training. The day to day variations in the sensation of fatigue should not be confused with failing adaptation. Chronic fatigue can result from consecutive days or bouts of hard training or intense competition but can be relived with a few days of easy training, no competition and a carbohydrate rich diet. At present there are no clear signs or body alarm systems that indicate a failure to adapt to training, especially no early warning signals and as a result the process is often too fat along to be reversed. Most symptoms are subjective and identifiable only after athletes have overtaxed themselves. Many rowers also attempt to conceal failing to adapt from the coach in fear of loosing their seat in the boat although they may be aware that they are gradually seeing an erosion of their performance. This erosion may be difficult for the coach to evaluate since other crew members may unknowingly "cover up" for their poorly adapting teammate. A coach should also be especially aware of any athlete that begins to produce extraordinary training performances as they may be the most susceptible to failing to adapt. Because of their excitement about these performances they often over extend by training at a greater than normal intensity and duration.

With the onset of failing adaptation, the athlete usually experiences a vicious cycle or trying to overcome the poor training and competitive performances by training harder or changing technique. These responses more often lead to even greater physical and physiological deterioration and psychological frustration. The athlete, at this point, is uncertain about his/her skill and, in many cases, loses confidence. In addition increasing training effort or changing technique can lead to serious injuries that may prevent the athletes from ever competing up to their potential.

Specific Symptoms

Specific symptoms include the following:

Physical and Physiological

1. Excessive and unusual weight loss
2. Change in body composition; decrease in body fat
3. Decreased appetite
4. Local muscular tiredness and heaviness
5. Sleep disturbances
6. Elevated heart rate, blood pressure and core temperature
7. Decrease in immune protection
8. Decrease in male and female sex hormones
9. Overworking

Psychological

1. Frustration
2. Loss of confidence
3. Wide mood swings
4. Uncertainty
5. Tentative
6. Irritable
7. Uncommunicative and quite
8. Self pity
9. Tardiness and missing work outs
10. Looking for excuses
11. Depression
12. Anxiety
13. Trying too hard
14. Inability to relax

Causes

Physiologists agree that there is no greater physical stress that a human must tolerate than exercise. A muscle cell is unparalleled among living cells in its ability to increase its metabolism; by 1000 times if necessary. A normal response to a continued exercise stress is an improvement in the muscle fibers response and all of its support systems, thus adapting to exercise and the desired result is better performance. A normal stimulus response relationship would be:

1. Increase in training
2. Increase in Physiological factors
3. Increase in performance
4. Increase in confidence (positive reinforcement)

The process of training and its effect on performance can be compared to a theory of adaptation proposed by Seyle in the 1950's. Seyle proposed a General Adaptation Syndrome (GAS) for the purpose of training to explain the ability or inability to cope with stress. He divided his GAS into three stages; Alarm Reaction (AR), Stage of Resistance (SR), and Stage of Exhaustion (SE). Seyles AR can be compared with the introduction of high intensity training (stress stimulus) and positive early physiological changes (good response to stress). As the training stimulus is continuously and increasingly applied and the body responds by improving performance then this successful response is analogous to Seyle's SR. However if the response to training is failing adaptation then this failure represents SE and if this stage is reached then the problem is difficult or impossible to correct. In fact, the extreme of Seyle's SE is death of the organism or structure. This abnormal response can be represented as follows:

1. Increased Training
2. Decreased Physiological Factors
3. Decreased Performance
4. Decreased Confidence (negative reinforcement)

Although the caused for deterioration in performance are not clear, it appears that the intensity of training can be a greater negative stress than either the duration or frequency of training. There is also evidence to show that problems unrelated to training may be partially or wholly to blame for failing adaptation among them; job and or school related, social, economic, or personal.

Several possible physiological and physical causes of failing adaptation have been suggested and among them are:

1. Rapid increase in training intensity and or volume; it is suggested that less than one percent increase per week for intensity and 3-5 percent per week for volume be used.
2. Chronic damage to muscle cells, death of cells
3. Overload of immune system
4. Abnormal endocrine responses
5. Disruption of connective tissue; tendon and ligament destruction
6. Nutrition deficiency; vitamin, mineral etc
7. Depletion of energy sources; glycogen, fats etc
8. Red blood cell damage and destruction
9. Chronic dehydration; decrease in blood volume
10. Anorexia nervosa
11. Abnormal cardiac rhythms
12. Decreased liver function
13. Chronic elevation of core temperature

Possible psychological causes, like the physical and physiological causes listed above, are linked closely to the many symptoms mentioned previously. The continued erosion of confidence, overworking in response to ever decreasing training and competitive performances, and constant frustration, are among a few of the important psychological causes of failing adaptation.

Measurement for Failing Adaptation

Although several attempts have been made to measure failing adaptation, especially attempts at early identification, thus far no accurate measurements are available to either to predict its onset or even detect if at has already occurred. It is often difficult to differentiate what may be abnormal physiological responses related to failure to adapt or simply normal responses to heavy training. Scientific studies describing failing adaptation are sparse because of the difficulty in isolating and measuring specific factors associated with this phenomenon. It is extremely difficult to control and manage such studies. However, based on the limited research and the many observations by coaches and athletes over the years, the following seems the most promising of possible measurements.

Measurements used previously:

1. Resting heart rate and chronic increases in blood pressure
2. Cardiac arrhythmias (changes in heart rhythm)
3. increase in white blood cells; increase in eosinophil levels
4. Increase in cortisol levels
5. Chronic hypoglycemia
6. Decrease in muscular power and VO2 Max
7. Decrease in muscle glycogen
8. Decreases in testosterone (male) and estradiol (female) or disturbances in free testosterone and bound testosterone, decrease in Tf/C
9. Increased lactic acid for standard submaximal exercise

Measurements that may have potential worth:

1. Body composition; abnormal decreases in body fat and lean body mass (LBM) and change in fat/LBM ratio
2. Chronic elevation in endorphin levels
3. Abnormal liver function tests; increases in SGOT and SGPT
4. Changes in endorphin levels
5. Decreases in hemoglobin; chronic anemia (athletes anemia); disturbances in erythropoietin
6. Volume of Rapid Eye Movement sleep
7. Chronic decrease in blood volume
8. Chronic elevation of skeletal muscle enzymes

The most attractive factors for possible investigation are blood volume, body composition, muscle enzymes, core temperature, and red blood cell status, most of which are closely linked physiologically.

I am convinced that periodic submaximal ergometer testing may prove beneficial. Athletes should be tested frequently during the periods of high intensity or high volume training using rowing ergometry and power outputs ranging from 60 to 80 percent of maximum. Measurements of submaximal heart rate, VO2, lactic acid, O2 deficit, and O2 debt, and along with some of the other specific measurements listed previously may prove to be useful in predicting and detecting failing adaptation. We have developed a test based on three consecutive submaximal efforts on a rowing ergometer that provides useful data concerning an athletes specific physiological responses to training periodicity. In addition to measuring heart rate and lactate responses during and following 60, 70 and 80 percent of a mean maximal power output of the group, other physiological factors described in this measurement section could be evaluated. It is also important to conduct most of these measurements during resting or recovery conditions without the immediate effects of exercise as examination of possible failing adaptation factors could be masked by the acute effects of a training session.

Prevention and treatment of failing adaptation

Since it is difficult to identify any clear preliminary or early warning signs of failing adaptation, it is equally difficult to prevent it. Any coach or athlete would, of course, prefer not to see conditions developing where, no matter what the training strategy may be, performance continues to decrease. Some coaches suggest that there is no such phenomenon as failing to adapt to training but it is simply the fault of the athlete. In other words it may be an inherent quality or qualities of the athlete that prevent adaptation and thus these failing athletes do not have the physiological and psychological capacitates to adapt and thrive in a prescribed systematic training and racing program. The coach and athlete must also give careful attention to recovery or rest periods; they often forget that the length of these periods is equally as important as the intensity of the specific workout or series of work outs in the determination of overall training intensity. The length of recovery and rest periods are often overlooked and it may be that the insertion of a longer than planned rest or recovery period at a critical time in the high duration or intensity portion of training may help eliminate failing adaptation. It may also be necessary to modify training sessions when athletes appear not to respond well to duration or intensity of work.

Although some of the measurements discussed earlier may aid in helping to predict or reveal failing adaptation, the most effective measure is the coach's knowledge of athletes and the self awareness of the athletes themselves. Not only should athletes and coaches record such daily entries in training diaries as distances, stroke rates, times, total volume, number of hard strokes, heart rates, lactates etc, but more importantly both coach and athlete should carefully and immediately after each training session record their subjective feelings about the work out; this procedure should also be used for the major training phases or periods. I would suggest that these observations of coaches and athletes be constantly compared so that a continuous line of communication be maintained between coach and athlete comparing how the coach views the responses of the athletes and how the athletes themselves feel; a simple rate of perceived exertion scale could be used.

I would strongly recommend that the coach and scientist combine their efforts to seek ways of predicting failing adaptation. I believe the most promising areas of physiological research are local muscle changes, "athlete anemia" and chronic dehydration, increased core temperature, and lowered blood volume, the latter factor being the most important. However, the scientist cannot be with the athlete at every training session and thus it will ultimately be the coach who must find better methods of predicting and detecting failing adaptation.

Although some of the causes of failing adaptation are not clear and this problem more likely results from a combination of some or all of the factors discussed in this presentation, it is probable that the intensity, speed or rate, of training is a more important stress than volume of training. Diminishing the prospects of failing adaptation results from a significant reduction in training intensity or complete rest. Many coaches believe that failing adaptation symptoms can be reduced or eliminated by a few days of light training when it would be best for the athlete to rest completely for 2 to 3 days, followed by 3 to 4 days of some form of easy cross training. It may be recommended that the athlete seek some form of counseling especially if the problem is non sport related such as poor nutrition, or an academic, economic, or social problem.

Prevention is obviously preferable to having to cure failing adaptation. It is no secret that in order to minimize the risk of failing adaptation it is best to use a periodic training program where easy, moderate and hard training periods are alternated. As a rule, one or two days of intense training should be followed by an equal number or more of easy training days. This should also apply to weekly planning and 1 to 2 weeks of hard training should be followed by a week of easy work.

In summary, I believe that there is only a subtle difference between what are normal responses to heavy training and the abnormal responses associated with failing adaptation, in fact, so finite that it may not be possible to measure, detect, and prevent. However, this is such a major problem that the coach and scientist must work closely together to discover possible early warning signs and thus still have time to reverse this debilitating condition.

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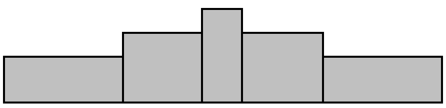
ASSOCIATION OF ROWING COACHES, SOUTH AFRICA

CREATING TRAINING PROGRAMS

SPRACKLEN'S NOTES – PART 2

WORKOUTS
This section implements all of the preceding sections. For the most part each workout is outlined in terms of training effect, training load, and technical aim; these will be bolded for ease of understanding.

PYRAMID
Change rates at 3' 2' 1' 2' 3' 4' - 11' total.
Rates increase then decrease by 2 at each change.



		Minutes					Total
		3'	2'	1'	2'	3'	11'
PYR 24	5 sets at rates	20	22	24	22	20	55'
PYR 26	5 sets at rates	22	24	26	24	22	55'
PYR 28	4 sets at rates	24	26	28	26	24	44'
PYR 30	3 sets at rates	26	28	30	28	26	33'
PYR 32	3 sets at rates	28	30	32	30	28	33'
PYR 34	2 sets at rates	30	32	34	32	30	33'

When the above Pyramids are rowed continuously -each set piece with a five-minute period of light paddling between sets - ***training effect*** is improvement of aerobic capacity.

When these Pyramids are rowed intermittently -one minute light paddling between each rate change and a five minute rest period of light paddling between sets -***training effect*** is improvement of aerobic capacity and acclimatization of lactate in the body

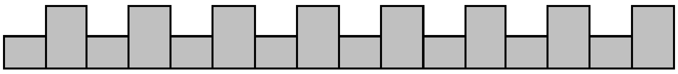
All the above work is Normal ***training load***, but can be increased or reduced by 25%. Alterations should be made to times, making sure that the Pyramid principle is retained, but normally a different type of work would be done if it is necessary to amend the load for the best training effect.

Technical aim is to establish good technique at the lowest rate and to hold this quality as the rate increases. This method is a useful part of the system because longer pieces are rowed at the lower rates and the quality at the higher rates has to be held for a shorter space of time. It is equally important to hold quality when rates drop during the second half of a Pyramid.

When no suffix is shown, one only set is required.

A Half Pyramid refers to first half.

CASTLE



Method	Rates	Minutes	
		Changes	Total
CAS 24 N	22 & 24	2'	66'
CAS 26 N	24 & 26	2'	44'
CAS 28 N	26 & 28	2'	36'
CAS 30 N	28 & 30	2'	26'

This work is continuous. If turns are necessary, they should be made within 30 seconds with work resuming as quickly as possible. ***Training effect*** is improvement of aerobic capacity.

Method	Rates	Minutes		Execution
		Changes	Total	
CAS 32 N	30 + 32	2 '	24'	3 x 8'
CAS 34 N	32 + 34	1½	18'	3 x 6'
CAS 36 N	34 + 36	1¼'	15'	3 x 5'
CAS 38 N	36 + 38	1'	12'	3 x 4'

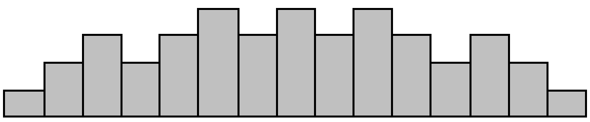
This work is intermittent with five minutes of light paddling between sets. ***Training effect*** is development of anaerobic capacity.

Training loads 'N' = Normal training load of approximately 80%
'H' = High training load of 100%, an increase of 25%
'L' = Low training load of 60% a decrease of 25%

Technical aim is to establish good quality at the higher rate making sure that the quality improves when more time is available at the lower rate.

Where the stretch of water does not permit more than eight minutes of continuous work the changes are reduced to 1½ minutes. Below five minutes the changes are reduced to intervals of one minute. The total time for the method remains.

PYRAMID CASTLE



1. PYR/CAS 28 L

The rates change every one-minute as follows:

22,24,26,24,26, 28,26,28,26,28, 26,24,26,24,22.
Continuous work for 15 minutes x two sets =total work 30 minutes.

The rate of striking (stroke rate) increases by two strokes at the end of each minute. At the end of the third minute the rate returns to the rate of the previous minute and starts the same process again until the maximum rate of 28 is reached. The method then follows a pattern of the same format returning to the original rate of 22.

'N' Normal ***training load*** is three sets x 15 min - total 45 minutes.
'H' High ***training load*** is four sets x 15 min - total 60 minutes.

2. PYR/CAS 30 N

The rates change every one minute as follows:

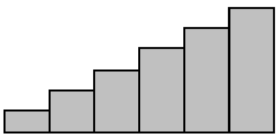
24, 26, 28, 26, 28, 30, 28, 30, 28, 30, 28, 26, 28, 26, 24
Continuous work for 15 minutes x two sets = total work 30 minutes. The format is exactly as for PYR/CAS 28 above.

'H' High ***training load*** is three sets x 15 minutes - total 45 minutes.
'L' Low ***training load*** is one set of 15 minutes.

Technical aim. This method is a valuable part of the System. If the oarsmen are unable to hold quality when rates increase the reduction of rate gives sufficient time for the quality to be re-established.

If the stretch of water allows thirty minutes of continuous work the changes should be increased to two minutes. When no suffix is shown, one only set is required.

STAIRCASE



				Minutes		
Method	Sets	Rates	Changes	Set	Total	Light
S/C 26 N	3	x 20:22:24:26:	4'	16'	45'	3'
S/C 28 N	3	x 20:22:24:26:28:	3'	15'	45'	3'
S/C 30 N	3	x 20:22:24:26:28:30:	2'	12'	36'	2'
S/C 32 N	3	x 22:24:26:28:30:32:	1½'	9'	27'	1½'
S/C 34 N	4	x 24:26:28:30:32:34:	1 '	6'	24'	1'
				Strokes		
S/C 36 N	8	x 26:28:30:32:34:36:	10	60	480	2'
S/C 38 N	7	x 28:30:32:34:36:38:	10	60	420	2'
S/C 40 N	6	x 30:32:34:36:38:40:	10	60	360	2'
S/C 42 N	5	x 32:34:36:38:40:42:	10	60	300	2'

All work is rowed continuously for each set with light paddling between sets.

The ***training effect*** of staircases below rate 32 are basically for improvement of aerobic endurance and above 32 the work is anaerobic.

Training load. When no suffix is shown on the schedule this indicates that only one set piece is required. If more than one Staircase is required, the Method Code will be preceded by the number e.g. 2 x 5/C 40. Staircases are seldom used for an entire workload; they are used to supplement others to make a useful session of complex work.

Technical aim is to establish quality at the lowest rates and to hold good form throughout the session. Technically this is one of the toughest exercises in the scheme.

LADDER

Row 20 strokes at each rate with 10 light strokes between each change. Rates increase by 2 strokes per minute.

Method	Rates	Strokes	Set	Total	Light
LAD 26 N	20: 22: 24: 26	80	24	1920	1'
LAD 28 N	20:22:24:26:28	100	16	1600	1'
LAD 30 N	20: 22: 24: 26: 28: 30	120	12	1440	1'
LAD 32 N	22: 24: 26: 28: 30: 32	120	9	1080	2'
LAD 34 N	24: 26: 28: 30: 32: 34	120	8	96O	2'
LAD 36 N	26: 28: 30: 32: 34: 36	120	7	840	2'
LAD 38 N	28: 30: 32: 34: 36:38	120	6	720	3'
LAD 40 N	30: 32: 34: 36: 38: 40	120	5	600	3
LAD 42 N	32: 34: 36: 38: 40: 42	120	4	480	3

Row 20 strokes at each of the above rates with 10 light strokes between. Light paddling for five minutes between each set.

Pulse rates should drop between 100 and 120 per minute during light paddle after each set before the next set is started. The recovery times are a guide and should be adapted to meet the required rest period for each crew.

The rate should be built up before the tenth stroke and the target rate held for the last ten strokes.
When no suffix is shown, one only set is required. When more than one set is required the Method code will be proceeded by the quantity.

The sets shown indicate the total work required for a Normal training load. It is not suggested that a LAD 26 N be done in its entirety for one session. LADDER work is a useful training method; it adds variety to a session and flexibility to the training loads.

Example: LADDER PROGRAM
LAD/PROG 40 N
22:24:26:28:30:32
24:26:28:30:32:34
26:28:30:32:34:36
28:30:32:34:36:38
30:32:34:36:38:40 600 strokes.

Row for twenty strokes at each of the above rates with 10 light strokes between.

CONSOLIDATION

Method	Rate	Minutes
CON 20N	20	120'
CON 22 N	22	80'
CON 24 N	24	60'
CON 26 N	26	40'
CON 28 N	28	30'
CON 30 N	30	24'

Training effect of the above work is improvement of aerobic endurance.

CON 32 N	32	20'	4 x 5" with 5' light between.
CON 34 N	34	15'	5 x 3' with 3' light between.
CON 36 N	36	12'	6 x 2' with 2' light between.
CON 38 N	38	9'	6 x 1½' with 1½' light between.
CON 40 N	40	8'	8 x 1' with 1' light between.

Training effect of this work is improvement of anaerobic endurance.

All above work is at Normal ***training load*** of approximately 80%. Times should be increased or decreased by 25% for amendments.

Technical aim is to Consolidate equality at a specific rate. Good quality must be established early in the session and held throughout the period of tiredness, which gradually develops until it reaches its peak of exhaustion at the end of the work.

SPEED WORK

Method	Rates		
SPE 36 N	36	5 (5 x 20 strokes 10 light)	500 strokes
SPE 38 N	38	4 (5 x 20 strokes 10 light)	400 strokes
SPE 40 N	40	3 (5 x 20 strokes 10 light)	300 strokes

Build the rate up over 10 strokes and hold the target rate for the remaining ten strokes.
For 'H' high ***training load*** the rest period between strokes is reduced to 5 strokes light.
For 'L' low ***training load*** the rest period between strokes is increased to 20 strokes light.

Example: SPEED PROGRAM
SPEED/PROG N above race rate.

5 x	20	strokes	10	light	5' rest
5 x	20	strokes	5	light	5' rest
5 x	20	strokes	5	light	5' rest
5 x	20	strokes	10	light	5' rest
5 x	20	strokes	15	light	5' rest
5 x	20	strokes	20	light	600 strokes.

SPECIFIC WORK
Other types of work can be included in the system.

Examples would be:

1. Timed rows:
   a. 6 x 500m
   b. 4 x 1OOOm
   c. 3 x 15OOm
   d. 2 x 2OOOm
2. Racing starts and the change from high rate into race pace.
3. Fartlek - 600 strokes at free rates involving large increases and sudden changes.
4. Any work at natural rate of striking.
1. Practice courses e.g. Head races.
   Sprints.

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SUMMARY OF WORKOUTS

Methods			Loads				
PYR	26	N	76	mins	4 sets	x 19	mins
	28	N	57	mins	3 sets	x 19	mins
	30	N	38	mins	2 sets	x 19	mins
	32	N	30	mins	2 sets	x 15	mins
	34	N	22	mins	2 sets	x 11	mins
	36	N	19	mins	1 set	x 19	mins
	38	N	15	mins	1 set	x 15	mins

CAS	24	N	66	mins	2 mm.	changes
	26	N	44	mins	2 mm.	changes
	28	N	36	mins	2 mm.	changes
	30	N	26	mins	2 mm.	changes
	32	N	24	mins	3 sets	x 8 mins
	34	N	18	mins	3 sets	x 6 mins
	36	N	15	mins	3 sets	x 5 mins
	38	N	12	mins	3 sets	x 4 mins

PYR/CAS	28	L	30	mins	2 sets	x 15 mins
	30	N	30	mins	2 sets	x 15 mins

								Changes.	
S/C	26	N	48	mins	3 sets	x 16	mins	4	mins
	28	N	45	mins	3 sets	x 15	mins	3	mins
	30	N	36	mins	3 sets	x 12	mins	2	mins
	32	N	27	mins	3 sets	x 9	mins	1½	mins
	34	N	24	mins	4 sets	x 6	mins	1	mins
	36	N	480	str	8 sets	x 60	str	10	str
	38	N	420	str	7 sets	x 60	str	10	str
	40	N	360	str	6 sets	x 60	str	10	str
	42	N	300	str	5 sets	x 60	str	10	str

LAD	26	N 1920	str	24 sets	x 80	str.	4	x 20:10	light.
	28	N 1600	str	16 sets	x1OO	str.	5	x 20:10	light.
	30	N 1440	str	12 sets	x120	str.	6	x 20:10	light.
	32	N 1080	str	9 sets	x120	str.	6	x 20:10	light.
	34	N 960	str	8 sets	x120	str.	6	x 20:10	light.
	36	N 840	str	7 sets	x120	str.	6	x 20:10	light.
	38	N 720	str	6 sets	x120	str.	6	x 20:10	light.
	40	N 600	str	5 sets	x12O	str.	6	x 20:10	light.
	42	N 480	str	4 sets	x120	str.	6	x 20:10	light.

CON	20	N	120	mins.		
	22	N	80	mins		
	24	N	60	mins		
	26	N	40	mins		
	28	N	30	mins		
	30	N	24	mins		
	32	N	20	mins	4 sets	x 5 mins
	34	N	15	mins	5 sets	x 3 mins
	36	N	12	mins	6 sets	x 2 mins
	38	N	9	mins	6 sets	x 1½ mins
	40	N	8	mins	8 sets	x 1 mins

SPE	36	N	500	str	5 sets	x 100 str (5 x 20:10 light)
	36	N	400	str	5 sets	x 100 str
	40	N	300	str	5 sets	x 100 str

EXERCISES

Exercises are a useful means of putting across a technical point to an oarsperson. There are many exercises that are used by coaches to emphasize a particular point or movement depending on the style the coach is teaching his/her oarsperson. The best exercises are an exaggeration of a particular movement the most useful of which are shown below.

In performing an exercise it is only of great use if it is carried out for long periods. At least 20 minutes of continuous work at one exercise is needed to achieve beneficial effect. Rowing Just 20 strokes is of little value.

Sometimes a complete outing or a work program should be with square blades or from the ‘strong point’ position (defined in the following section) for most benefit from the exercise.

SHORT SLIDE ROWING
The benefit to be gained from this exercise is that:

I. The blades enter the water at a fast point in the stroke and have to move very quickly to achieve grip on the water. Because the stroke is short, the quickness has to be emphasized otherwise there is not a sufficient amount of the stroke to be effective. The sooner the blade grips the water the longer the stroke will be and the more it will achieve.
II. The shorter slide puts the legs in a stronger position for lively work. Muscles are stronger when they work through their middle range of movement of the limb. The oarsperson is able to spring his legs very quickly from a short slide position.

The object of the exercise is to achieve quick catches with the leg drive.

The exercise can be performed in various slide lengths. The most common phrases are ¼ slide, ½ slide, and ¾ slide.

The most valuable form of short slide rowing is called 'strong point' rowing. The rower sets himself/herself ready for the next stroke in a position which he/she feels is his/her strongest for a hard drive into the stroke. Normally this position is between 3/4 and full slide. As the rower learns to relax during his/her float forward and as he/she becomes more flexible, his/her length forward will gradually increase and he/she will become stronger in his/her forward position.

Rowing for 10 strokes in the 'strong point' position followed by 10 full length strokes is a very good exercise. It encourages a powerful stroke to which full length is then added, making the ultimate stroke - "long and powerful".

SQUARE BLADE PADDLING
Rowers are generally inclined to carry their blades **forward** too close to the water, particularly from extraction to the halfway point forward. They will be inclined to cut some corners when the rates climb and probably the first will be to reduce the circular movement at the extraction of the blade. If the oarsperson already has a small circular movement his next step may be to cut short the finish of his stroke. It is important that during the winter 'grooving in' period exact movements are carried out. Square blade paddling teaches an oarsperson the correct hand movement.

Rowing with a squared blade forces the oarsman to make full use of the small amount of room available over his thighs until his hands have cleared his knees. It also encourages a lively draw so that pressure is maintained on his blade. It is the pressure on the blade that helps a clean extraction.

Other benefits from Square Blade Paddling are that good balance is essential and the rower grows confident in his ability to balance the boat in adverse conditions, such as rough water and strong winds.

SOUTH AFRICA

SAMPLE PROGRAM
PERIOD 2: 14 to 29 November.

TRAINING AIM:
Development of aerobic capacity with some strength improvement

TECHNICAL AIM:
To make full use of body weight at the finish, make sure that the body swings back while the blade is driving through the stroke, and do not let the body curl forward at the finish.

DAY	1	a.m.		CON 22 L
		p.m.		CAS 24 N
	2	a.m.	6	LAD 26
		p.m.		PYR 26 N
	3	a.m.		CON 24 L
		p.m.		CAS 26 H
	4	a.m.	4	LAD 28
		p .m.		PYR 28 N
	5	a.m.		S/C 26 L
		p.m.		PYR 30 N
	6	a.m.		S/C 30 L
		p.m.		LAD 30 N
	7	a.m.		Rest
		p.m.		Rest
	8	a.m.		CON 26 L
		p.m.		PYR/CAS 28 L
	9	a.m.		PYR 30 N
		p.m.		CAS 28 N
	10	a.m.	6	LAD 28
		p.m.		PYR 30 H
	11	a.m.		S/C 28
		p.m.		PYR/CAS 28 L
	12	a.m.		CAS 26 N
		p.m.		PYR 30 L
	13	a.m.		CON 28 N
		p.m.	2	S/C 30
	14	a.m.		Rest
		p.m.		Rest

TARGET RATE: 28

TIME KEEPING AND RATINGS CONTROL

A means of measuring the stroke rate and the timed pieces is essential. A stroke meter is the ideal instrument, but a normal stopwatch can be used successfully. Counting the number of strokes rowed for each minute or part of a minute can identify ratings. The easiest way is to count the strokes completed in 15 seconds, 30 seconds and then the full minute, for greater accuracy. For example:

8 strokes in 15 seconds = rate 32 (8 strokes x 4)
16 strokes in 30 seconds = rate 32 (16 strokes x 2)
When counting the strokes it is easier to count the number of ‘catches’ rowed. A stroke begins and finishes at the same place and nine catches are equal to eight strokes. Seventeen catches are equal to sixteen strokes, and thirty three catches are equal to thirty two strokes per minute.

ASSOCIATION OF ROWING COACHES, SOUTH AFRICA

COACHING

BECOMING AN ATHLETIC DEVELOPMENT PROFESSIONAL

I have been contacted by several people that asked me for advice on what it takes to be an Athletic Development professional as they are looking to get into the field.

Passion – A genuine enthusiasm for what you do. Not just when there are crowds and on game day but everyday.

Experience – Train for several sports, coach several sports. There is no substitute for having to put your butt on the line on game day as player or a coach. This is essential. This does not mean you have to be a star, but at least participate.

Study and Observe - Get around great coaches. See how they work. See how they praise ands scold. Learn everything they do. I once followed a German track coach, Gerd Osenberg around for a week. I wrote down everything he did. I used to go to the 49ers training camp in the early seventies because they had a good linebacker coach. I still use some of those drills today!

Learn & Research – Read scientific journals, coaching journals, technical journals. Get away from the internet and go for straight facts. Study video.

Practice – Get proficient at the skills you must teach. Be able to capably demonstrate the movements. Know skill progressions and how to teach

Be Organized – Plan and have a contingency plan. Be on time and stay late.

Look the Part – Get fit, dress the part and dress appropriately.

Communication Skills - Sharpen them. Realize all the dimensions' of communication.

Have a life – Take care of your family and reserve some time for yourself.

As a last thought remember it takes at least twenty years to be an overnight success.

ASSOCIATION OF ROWING COACHES, SOUTH AFRICA

TECHNIQUE

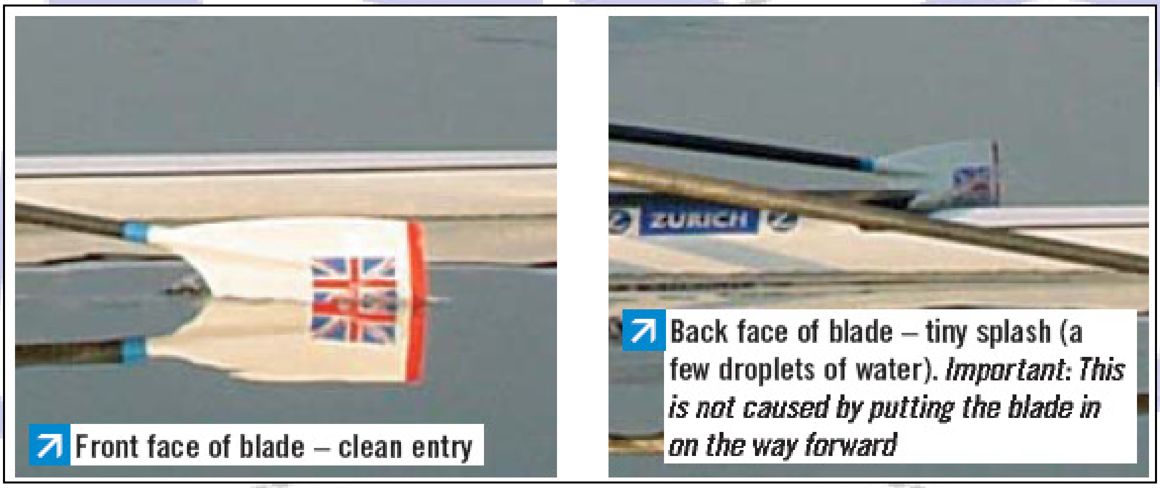
THE TIMING OF THE CATCH

The timing of the catch is a critical part of the rowing stroke which makes a significant difference to boat speed. The majority of rowers and coaches appreciate this and spend a lot of time working on it, yet what exactly rowers should be aiming for still seems somewhat shrouded in mystery.

To illustrate my point, I spoke to some coaches. "What is back-splash and is it a good thing?" I asked. "When should you place the catch?" There was little agreement about whether back-splash was towards the stern or the bow and certainly no agreement about whether it was a good thing or not. In fact the only common response was that "It's a question that seems to create an awful lot of confusion."

The timing of the catch is not a black art, but hopefully it is something that can be explained and understood. The aim of this article is to explain the basics and then discuss a subtlety that I believe may be the root of some of the confusion.

A correctly timed catch. The blade speed is matched to the water speed and there is very little splash



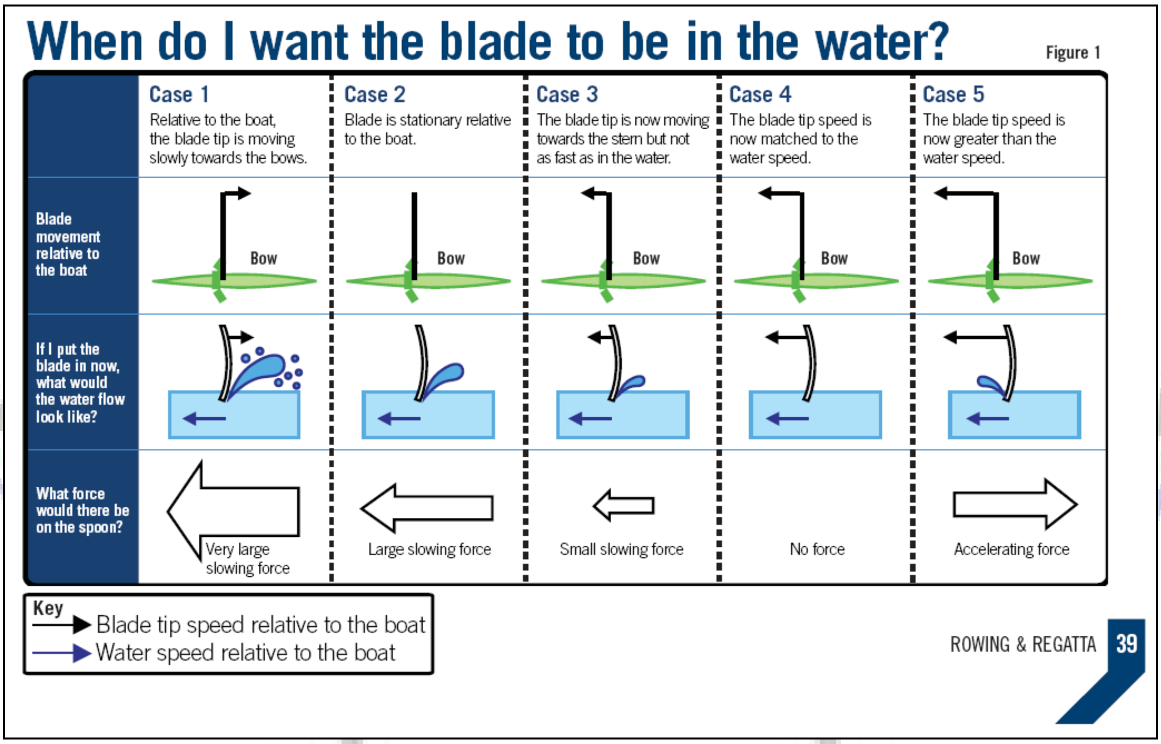
Front face of blade – clean entry

Back face of blade – tiny splash (a few droplets of water). *Important: This is not caused by putting the blade in on the way forward*

THE BASICS

If we could put the blade in instantly, when would we do it?
When we put the blade into the water, if it's moving more slowly than the water, we will get a splash towards the bow and a slowing force on the blade. If it's moving at the same speed as the water then there will be no force on the blade and little or no splash. If it's moving faster than the water then there will be a splash towards the stern and a force on the blade that will accelerate the boat and rower.

Figure 1 illustrates what happens in more detail as the blade approaches the catch. If you were to put the blade in at cases 1 or 2, then you would get a large force slowing the boat down (and may injure yourself at high speeds and rates). If you put the blade in at case 3, then you would still get a small force slowing the boat down. At case 4 the blade speed is matched to the water speed and there will be no be force if the blade is put in the water now (and little or no splash). By case 5 the blade speed is now high enough for the water flow to switch to the other side of the blade. If you put the blade in now you will be able to produce a force in the correct direction and accelerate the boat and rower. So from these pictures we can see that case 4 is the first point at which we can put the blade in without slowing the boat down.

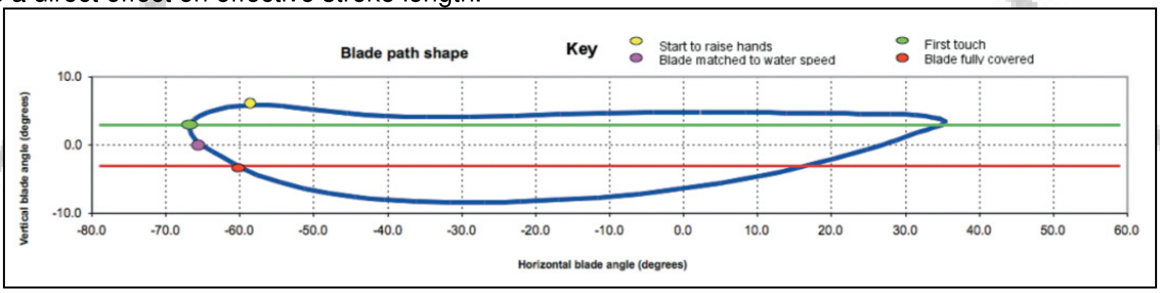


What happens if the blade is placed late?
A blade that is covered significantly after it has reached water speed will increase the catch slip. That is, it will reduce the effective stroke length. Put another way, the same effective stroke could have been achieved with a shorter overall stroke length and hence less wasted energy on relative movement between the boat and the rower.

What happens if the blade is placed early?
Placing the blade early will lead to a negative force on the handle. This should be avoided and could cause injury if done at high boat speeds or rating (more on this later). These two opposing factors – wasted effective stroke length versus check on the boat – are what makes the catch so critical in maximising boat speed.

In reality, we can't put the blade in instantly so what happens in practice?
It takes time from when you first start to raise the hands to when the blade first touches the water. I'm probably stating the obvious here but this is because the blade has to travel a certain vertical distance before it reaches the water and also because when you first try to move the blade vertically you can't instantly impart it with velocity. The blade has inertia so the force you apply builds up the vertical speed progressively. Typically it takes around 0.25 seconds from when you start to raise the hands to when the blade first touches the water.

It also takes time from when the blade first touches the water to when it is fully covered. Typically this takes around 0.1 seconds. Any time taken from when you start to raise the hands to when the blade first touches can be compensated for by simply starting to raise the hands earlier. However, it is important to minimise the time taken to cover the blade as this has a direct effect on effective stroke length.



Is it enough to let the blade fall under gravity?
If you raise the hands quickly enough that you allow the blade to fall under gravity, the acceleration is around 240 deg/s/s and this typically leads to a time to cover of 0.09 seconds. Club rowers are often slower than this. That is, they are still applying some downward force onto the blade as they allow the handle to rise, typically leading to a time to cover of around 0.13 seconds. Top-level rowers are achieving accelerations greater than gravity. Typically 300-400 deg/s/s at high ratings which lead to times to cover as low as 0.06 seconds. This reduced time to cover the blade is significant and can only be achieved by applying an upward force on the handle with the thumb. More detailed information on this is available at www.precisionsport.co.uk

So how do we time the catch?
It usually takes longer to make the vertical movement (0.25 seconds) than to accelerate the blade to boat speed (0.15 seconds) so you need to start raising the hands on the way forward in order to put the blade in at case 4 (typically 0.1 seconds before the horizontal direction change).

How do we know when we've got it right?
There will be very little splash initially because the blade entry is timed to coincide with the blade speed matching the water speed. This is followed by a larger splash towards the stern as the blade starts to go faster than the water and the blade force builds.

FINESSE
We are now going to talk about some subtleties, so don't let anything said here confuse you about the basics which still apply. Ideally you would want the blade fully covered at case 4, but this is not possible. To do this would mean that the first touch of the blade occurred when the blade was going too slowly and there would be a significant check on the boat. If, instead, you time it such that the blade has reached water speed before any of it touches the water, you have missed the first few degrees of the stroke. What the top rowers do (from bservation and measured data), is a compromise between these two. Typically the blade entry is timed so that the blade matches the water speed when it's around 50 per cent covered. That is, if the blade takes 8/100ths of a second to cover, then the first touch is about 4/100ths second early. Figure 2 shows this on a blade path shape where the magenta circle shows the point at which the blade matches water speed. This timing allows the rower to 'sneak' a few extra degrees of effective stroke.

Why do we get away with this?
• It is only a very small speed mismatch.
• It only occurs for a very small time (3-4/100ths of a second).
• The rower doesn't resist the blade handle.
When the blade first touches, there is a mismatch in speed but only a few centimetres of the blade are in the water so the handle force is very small. As the blade becomes more covered, the speed mismatch reduces until when the blade is 50 per cent covered the speeds are matched. The force is related to the speed difference and the area of blade in the water is always small. If the rower was to resist the negative force on the handle via the footplate then it would decelerate the combined system of boat and rower. (The same as if you hold the boat up.)

Instead what happens is the rower allows the handle to accelerate them towards the bow of the boat so the combined system of boat and rower is not slowed. In fact it happens so quickly that you don't really notice it. Visit www.precisionsport.co.uk to find out more.

What does this look like?
You may see a very small splash towards the bow from the lower half of the blade, followed by the usual larger splash towards the stern (see main photograph).

What are the key points?
• The splash towards the bow is not the thing to aim for. You are aiming to get the blade in as soon as is possible, which is done by practice and 'feel'. This (very small) splash is a consequence, not the desired effect.
• The blade should never touch the water on the way forward (case 1).
• The blade should never touch the water when it has reached its furthest forward (case 2).
• What we are talking about here is placing the blade after it has changed direction and started to move towards the stern. The blade is almost matched to the speed of the water before first touch and the mismatch only occurs for a few 1/100ths of a second.

I believe that some of this concept may have filtered down from top-level to club rowing and has been misunderstood such that people believe that a back-splash is a positive thing to be aiming for. Some coaches appear even to teach a large back-splash to encourage maximum forward placement which is not a sensible thing to do. You must match the blade speed to the speed of the boat at blade entry.

IN SUMMARY...

Use a high vertical acceleration on the handle to minimise the time to cover the blade.
• Start raising the hands on the way forward since it takes longer to make the vertical movement than to accelerate the blade to water speed.
• Time the blade entry to coincide with when the blade matches the water speed.
• There should be little or no splash initially – do not aim for a large back-splash.

ABOUT THE WRITERS
Dr Valery Kleshnev is recognised as a world expert in rowing bio-mechanics and provides technical analysis to

Jürgen Grobler and the GB team.

Tim Baker studied engineering at Cambridge University and then worked for Rolls-Royce designing civil jet engines before setting up Precision Sport Rowing Electronics in 2003.