



## 20 RACING

*Preparation for competition paddling is a long-term process. As a governing body we are committed to the guidelines of our Long Term Paddler Development framework, and this gives coaches a sound basis to look at this process, with particular emphasis on the best preparation at each physiological age grouping.*

### INTRODUCTION

This section outlines some of the key issues relating to this long-term preparation process.

It is not a definitive guide as the issues are vast, but both the BCU and Sports Coach UK and other agencies can provide more in-depth training for coaches in this and other related fields.

**Racing paddling is a power, endurance and skill activity. Preparation for a racing athlete includes a range of elements that build these capacities.**

1. Endurance
2. Strength and Power
3. Speed
4. Functional Stability
5. Technique and Skill Development
6. Psychological Skills
7. Racing Skills

Good nutrition, health, rest, supportive families and educational establishments, supportive programmes for promising athletes all play their additional but vital part in preparing successful athletes for racing.

All these elements will be relevant to the development of each paddler throughout their career from beginner to Olympic Champion.

Some elements will take priority at certain phases of development as shown in the Long Term Paddler Development framework.

As examples, endurance and cardiovascular development will be particularly central to development in the phase up to mid-teenage, the Train to Train phase.

Strength and power development will be central in different ways to the stage from puberty in girls and from 12-18 months after puberty for boys.

Table 1 shows an outline of the training progressions as they apply in the junior stages, following on from the onset of puberty and the end of the Start and Development stage.

## ► BUILDING ENDURANCE AND SPEED ENDURANCE

The physiological key to going fast in the boat is speed endurance, the ability to maintain a high speed for a relatively long period, i.e. 500m or 1000m and to be able to tolerate high levels of lactic acid. This can be a period of between 1.40 to 6 minutes according to the level of paddler.

To improve this we need to concentrate on *Aerobic and Anaerobic Power* development. We can develop these through both our water and land-based training depending on the time of year and the developmental stage of the athlete.

Before looking at training methods, it helps to have a basic understanding of how we produce energy and the different energy systems, so read Chapter 2 before you continue if you haven't already.

In our sport we are dealing with paddlers who may have aspirations to compete at distances between 200m and 36km and their individual training needs will differ, however there is a great deal more crossover than may first appear in terms of the physical requirements needed for both sprint and marathon racing.

For instance while it is true that a 36km marathon would rely primarily on a well developed aerobic (oxygen) system, the ability to tolerate lactic acid build up following the start, during a burn or at the finish is just as important in gaining a good end result. Likewise a 500m race requires good lactate tolerance following the start but also the speed endurance, which comes from the ability to work at the upper end of the aerobic system.

To develop these attributes we need to follow some basic principles when setting our programmes.

### The key elements of all training programmes are:

- Frequency - how often we need to do the session
- Intensity - how hard the session should be done
- Volume - varies depending on athlete
- Duration - how long is the session
- Sets - how many
- Reps - how many
- Rest - how much

## TRAINING ZONES

The Training Zones Table gives a guide as to how we put these elements into practice. We need to follow these principles otherwise, while we may be aiming for one outcome from our sessions, the final outcome may be completely different.

If the aim of the session was to develop sub-race pace a good session would be 6 x 1000m starting every 8min, maintaining a stroke rate of 95 per min. Increase the number of efforts to 8 x 1000m, reduce the rest and reduce the stroke rate and the session soon changes to a mix of threshold and core aerobic pace.

We also need to take into account ability and developmental stage of our athletes. Again taking the above session as an example, while an elite athlete may be able to complete the session properly, a younger, less experienced paddler may only be able to complete 4 x 1000m at sub-race pace.

(See Table 3- Training Zones).

## AEROBIC POWER

How do we develop Aerobic Power?

It is training at threshold level and particularly sub-race pace which will help increase aerobic power. We therefore need to make sure that we programme this type of work during the year whether it is land based or water based.

We also need to take into account the developmental stage of the athlete and the windows of opportunity laid out in the Long Term Paddler Development Model (LTPD).

While aerobic development is crucial throughout the athlete's career, there is a window of opportunity during the Train to Train phase (male 12-15 female 11-14) that is the optimum time to develop first aerobic capacity and then aerobic power.

Table 3 'Training Zones', shows how we can fit in the different types and elements of training into programmes during the paddler's different stages of development.

Some examples of threshold and sub-race pace paddling sessions are shown on Table 3 Training Zones. To get the same effect from running or swimming, the paddling sessions can be adapted based on time and intensity. For example to get a similar benefit from a threshold paddling session of 6 x 1000m (4.30 pace or 80% RP) with 4min rests, a paddler might run 6 x 1200m with 4min rests or swim 6 x 300m with 4

Train to Train					Train to Perform	
	Year 1	Year 2	Year 3	Year 4	Year 1	Year 2
Typical development age	boys 12-13 girls 11-12	boys 13-14 girls 12-13	boys 14-15 girls 13-14	boys 15-16 girls 14-15	boys 16-17 girls 15-16	boys 17-18 girls 16-17
Windows of opportunity Key times for development	Skill Aerobic capacity Strength development girls	Peak Speed Window Anaerobic aerobic capacity Strength development Hypertrophy g+b	PSW boys contd. Aerobic power Strength Development Hypertrophy g+b Girls +power	Aerobic power Strength development Hypertrophy g+b + power	Anaerobic power Strength development Max strength + power	Anaerobic power Strength development Max strength + power
Maintenance General development areas	Functional Stability	Skill Functional Stability	Skill Functional Stability	Skill Functional Stability	Skill Functional Stability General aerobic	Skill Functional Stability General aerobic
Skill	Different environments Wide range of skill developments Stability and feel Specialising on skill beginning	Increasingly discipline specific Stability and feel Still widening skill base Group and crew skills	Discipline specific Higher intensity Pace changes Group and crew skills	Discipline specific Higher intensity Increasingly race focussed Pace changes Crew skills	Discipline specific Racing performance focus Powerful paddling Boat feel in racing	Discipline specific Racing performance focus Powerful paddling Boat feel in racing
Volume Actual training time	4 –6 hours + other sports + non-activity coach time	6-8 hours + other sports	8-10 hours + other sports	10-12 hours	Up to 15 hours	Up to 20 hours
Sessions	3-4	4-5	5-7	8-9	8-11	8-11
Periodisation	Single	Single	Single	Single	Double or triple	Double or triple
Strength and Conditioning Land-based sessions Olympic lifting	2 per week often joint Girls general strength and begin structural hypertrophy Boys general conditioning Olympic lifting included	2 per week often joint Structural hypertrophy Coordinated strength Olympic lifting included	3 per week Structural hypertrophy Muscular endurance Coordinated strength Olympic lifting included	3 per week Structural hypertrophy into strength and power Muscular endurance Coordinated strength Olympic lifting included	3-4 per week Some structural hypertrophy Max strength and power Muscular endurance Coordinated strength Olympic lifting	3-4 per week Some structural hypertrophy Max strength and power Muscular endurance Coordinated strength Olympic lifting
Running Length and type a/c to season	2 per week + CAP joint sessions	2 per week + CAP joint sessions	2/3 per week	2/3 per week	2 per week min.	2 per week min.

Table 1 'Training To Train' and 'Train To Perform' training progressions.

min rests. Likewise in the gym, weight training sessions need to be adapted to meet the requirements for the different types of training. This of course is highly individual and will be determined by their abilities at running or swimming and here we may need to adapt programmes to suit the individual.

## TESTING AND MONITORING

To get a clear picture of the intensity athletes need to work at we should test and monitor them individually. Table 3 Training Zones gives a guide to test distance to be performed at % of 1000m race pace, however heart rate and lactate levels are highly individual. Using a paddler's 1000m race time as a baseline we can then monitor heart rate and stroke rate on the test distances and in turn we can ascertain the level at which paddlers should work during sessions. Finding individual lactate levels is difficult in club situations, as it requires taking and testing blood samples.

### ► Comfortable Pace And 3 Point Test

While not highly scientific the comfortable pace and 3 point test can give us a more individual guide to the level at which an athlete needs to work. To do this we need to be able to monitor workload and heart rate.

Below is an example of the test carried out on a treadmill using gradient to increase workload, but on a paddling machine this could be done by stroke rate.

The procedure for the test is:

1. Find the athlete's comfortable pace (this is done by observing and talking to the athlete); they should be working but still able to hold a conversation. We then keep the athlete at this level for 4 min. (In the example this was at a workload of 8.3, Minutes 10-13, Workload 1).

2. The athlete then reduces to a very easy workload until the HR drops below the level it was at 4min into the test (in this case 3 mins, Minutes 14-16).

3. The workload is then increased to 15% above comfortable pace for 4min and heart rate is monitored each min. (Minutes 17-20, Workload 2).

4. The athlete again reduces to a very easy workload until the HR drops below the level recorded at 4min into the test (minutes 21-22).

5. The workload is then increased a further 15% for another 4min, once again HR is monitored. (Minutes 23-26, Workload 3).

Once the test is complete we can plot the data on the graph (see Fig. 1 overleaf).

## HOW DO WE DEVELOP ANAEROBIC POWER?

- Training at race pace and peak race will increase our lactate tolerance and increase anaerobic power.
- Once again programmes need to fit the individual requirements of the athlete.
- There are windows of opportunity in the Train to Train phase and continued development in the Train to Perform phase.

The important thing to remember is that Race Pace Training is *not* race practice. It is training the athlete to paddle at the pace they require to reach their end goal.

For example:

If we are aiming for 500m at 1.43, then we are looking for 200m at 40sec speed.

Time*	Work	HR	Time	Work	HR	Time	Work	HR
1	3.0	87	11	8.3	178	21	2.1	135
2	3.5	90	12	8.3	179	22	2.1	125
3	4.5	114	13	8.3	181	23	10.9	200
4	5.5	129	14	2.1	173	24	10.9	200
5	6.0	144	15	2.1	128	25	10.9	203
6	6.5	149	16	2.1	128	26	10.9	206
7	7.0	152	17	9.5	182	27		
8	7.5	162	18	9.5	192	28		
9	8.0	169	19	9.5	194	29		
10	8.3	176	20	9.5	195	30		

Table 2 Example of results from a Comfortable Pace and 3 Point Test.

\* Time in one minute periods.

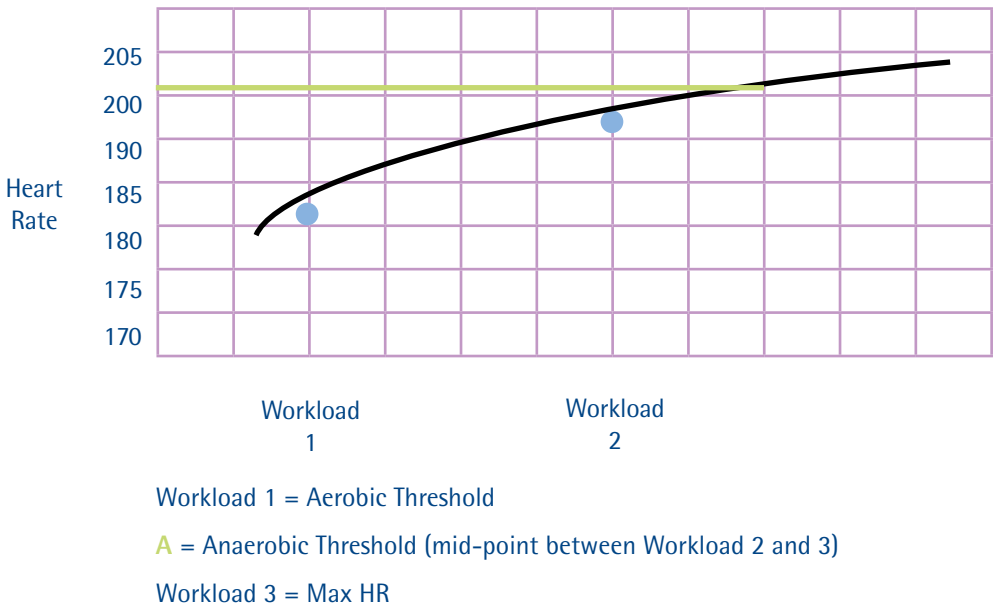


Fig. 1 Graph from a Comfortable Pace and 3 Point Test used to find athlete's Anaerobic Threshold.

- To train for this:
- 1. Work to achieve 200m in 40sec.
  - 2. Then work to do this with a more controlled powerful stroke.
  - 3. Over a period of a few months extend the distance at which race pace can be maintained, i.e. 200m – 300m – 400m.

Peak Race Pace training is the top pace you will reach in a race. It is important to train at this level, as it is difficult for the muscles to give up their energy, as there is a bottleneck effect. Training at Peak Race Pace makes this bottleneck less restrictive.

For a guide to training levels and sessions refer to Table 3 Training Zones.

CANOE RACING TRAINING ZONES

► Background

The creation of the training zones for Canoe Racing has come about due to the demand that we all use the same terminology for describing what training we are prescribing or carrying out. In the past there have been many different terms used to describe the same type of training. None of the terms were particularly wrong, it's just that they were different. Many of the terms originated from those used in other sports, athletics or swimming for example, and may not have

been completely transferable to canoeing. What we have tried to do here is to create a specific terminology which is as distinctive to canoeing as possible, but which also describes the type of training that needs to be carried out.

Once the same terminology is used and everyone is carrying out the training correctly, it is easier for squad programmes to be set with a continuum from young athletes to senior athletes. Progressions of training types, volumes and intensities can be set and followed more easily. Annual evaluations of an individual's or a squad's training can be accomplished with more accuracy than before, allowing more effective changes to take place.

► The Zones

We have tried to make the zones both practical and physiologically correct as much as possible. This is by no means comprehensive, and you could argue that some training intensities or types are missing, but included here are the ones that everyone involved felt covered the main requirements and needs of the flat-water paddler.

As can be seen the training speeds, heart rates and lactic acid levels will be different for each person, unless they have very similar competition results and physiological make-up, and so should be set individu-



Abbr.	Pace Name	Specific Physiological and Technical Aims of Training	Speed (% of 1,000m race pace)	Stroke Rate (% of 1,000m race pace)	Heart Rate (To be set individually)	Test Distance	Speed (To be set individually)	Perceived Levels of Exertion
AEROBIC METABOLISM	CAP Core Aerobic Pace	GENERAL ENDURANCE General improvements to aerobic system. Improving fat metabolism. Technique foundation.	60%	60+/-5		10km	1-2	Moderately comfortable. Intermittent conversation.
	THR Threshold Pace	SPEC. AEROBIC CONDITIONING Higher intensity aerobic improvements. Start of some aerobic work and lactate tolerance. Acceleration off the blade.	80%	75+/-5		5km	3-4	Slightly uncomfortable. Breathing heavily. More concentration.
	SRP Sub Race Pace	AEROBIC POWER Improving maximum ability to consume oxygen. Increasing lactate tolerance as anaerobic metabolism increases. Consolidation of near race pace technique.	90%	95+/-5		2000m	6-8	Hard, breathing very heavily but under control.
ENERGY SYSTEM INTEGRATION	RP Race Pace	RACE ENDURANCE Race practice, increasing ability to sustain high work rate. Maximum oxygen consumption and high lactic acid levels. Improving race technique.	100%	110+/-5	Max	750m	10+	Painful, breathing extremely hard. Lactic acid accumulation.
	PRP Peak Race Pace	PEAK RACE PACE Improving ability to sustain maximum speed. Improving anaerobic system and lactate tolerance. Keeping strong technique.	110%	130+/-5	N/A	200m	8+	Very hard, local muscular pain. High levels of lactic acid.
ANAEROBIC METABOLISM	MP Max. Pace	MAXIMUM SPEED Max. speed and power development. Improving anaerobic abilities - lactic and ATP-PC. Increasing maximum stroke rate.	112%	130-140 Max	N/A	100m	6	Fast and powerful, but physiologically comfortable.

## NOTES

**Resistance Work** - Additional resistance work may be added to the kayak during any of these sessions, by either adding weight to the kayak, or putting bungees or balls on the outside of the kayak.

**Technique** - Separate technique sessions have not been identified. A technique emphasis, or goal, should be placed on every session. The aims of technique development may determine the type of session which can be prescribed, or the aims of the physiological development may determine the technique emphasis during a particular session. The priority of technique development versus physiological progression will change throughout the year.

Table 3 Training Zones

ally, based on 1000m times, on-water lactic acid profiling or ideally both.

The most important aspect of using these or any other training zones is their periodisation through the year, and ensuring that the mix of training is correct to allow consistent advances in physiological abilities and technique, and therefore performance. This is where the coach's role lies: programming training for individuals and groups but allowing for differences in capabilities and rates of progression. More assistance in this area can be gained from talking to other coaches who have had many years experience of going through this process.

### ► Technique

The development of effective and efficient paddling technique is essential for success at high levels of competition. Its development can take place within these training zones, and each prescribed session should have a technique emphasis. This emphasis may range from development of fundamental aspects of technique at lower intensities to purely maintaining some of these aspects at higher training intensities. Due to this approach a separate 'technique training' zone has not been identified.

## ► FUNCTIONAL STABILITY

Before moving on to Resistance Training we should look at the concept of balanced training as developed in canoesport.

We are teaching paddlers to carry out a high skill, all-body activity. It is often impossible for athletes to develop beyond certain points technically and in performance in competition, without a sound level of functional stability.

If the paddler cannot lock the blade at the catch and hang onto that blade without the shoulder area stability breaking up, they will not be able to improve their skills and maximise good technique and performance in racing.

If the trunk area is weak and unstable, then the power generated by the body will not be transmitted into the forward movement of the boat in racing, or manoeuvres in moving water competition.

The BCU has instigated a programme of research and training to address this vital area, working with Joanne Elphinston, a leading physiotherapist and specialist in this field.

This programme has dovetailed with an English Institute of Sport promotion of a wider examination of functional strength training, looking at a holistic approach to the paddler's development, strength, power and the application of the power to produce a high level of skill and performance.

## WHAT IS STABILITY?

Stability will be defined as the ability of the body to withstand, support and generate forces with optimal efficiency and minimal musculoskeletal stress.

### ► Efficiency

This is the best result for the least effort.

This minimises muscular/skeletal stress where structures are working in their optimal range and position.

**As Racing Coaches, we are therefore interested in stabilising mechanisms for two reasons:**

- Performance optimisation
- Reduction in injury risk

Stability can influence all the major areas of performance by our paddlers.

- Speed
- Power
- Strength
- Flexibility
- Endurance

Paddlers with poor functional stability will borrow muscles whose prime role is in movement to prop up their stability.

Their movement muscle groups will fatigue early because they are also heavily involved in stabilising the body rather than just in moving the boat.

Their secondary stabilisers, controlling their movement, will quickly be ineffective.

To be successful with their paddlers, coaches need to be able to recognise the biomechanical elements of paddling.

They then need to be able to recognise the muscle groups and their role in the paddling movement, and their role in stabilising the body for that movement and controlling the movement.

A series of simple assessments has been devised where coaches can discover fundamental and then

more detailed areas where their paddlers do not have adequate functional strength.

These assessments identify problems that may affect technical paddling skill, under-performance in training and competition and areas prone to injury.

Armed with the identification of areas to work on, the coach can then institute a general and specific programme of regular exercises using little equipment other than fitness balls, medicine balls, broomsticks and a mat.

This can soon become a general programme of high quality physical preparation for the sport, starting at the age of 8, rather than a remedial activity for paddlers who have been injured or who are identified with performance restricting problems.

Workshops and a CD/DVD resource, "Functional Stability for the Paddling Athlete" support a regular BCU programme of workshops for coaches.

## ► RESISTANCE TRAINING

The outline here of a Strength Training programme for athletes preparing for competition paddling is necessarily brief compared with the extent of the material involved in becoming an expert in this field.

It is the recommendation of the BCU and racing disciplines that coaches who are involved in preparing young and adult paddlers will need to be trained and qualified specifically in this area.

To this end the BCU runs British Weight Lifting Association Leader, Instructor and Tutor courses on a regular basis, as well as in-house workshops and resources on the discipline-specific aspects of strength and power training.

BWLA workshops are also available around the country, though these are targeted more at Olympic lifting coaches.

The advantages to be gained from working alongside Olympic lifters is considerable. We can gain from some of their attributes in terms of speed, control and power.

Further joint resources from BCU/EIS are also available, illustrating good practice in programmes for flexibility, sport-specific strength and power.

There is a BCU programme of Functional Stability workshops and paper and CD/DVD resources available to back this up.

Contact either of the National Development Coaches at BCU Head Office for details of workshops or resource availability.

## RESISTANCE TRAINING FOR PADDLERS – THE RATIONALE AND THE PROCESS

*"The direct correlation between strength and speed and performance is a proven fact"*

*Csaba Szanto Hungary and ICF*

### ► The Target

Coaches in racing clubs are looking to develop paddlers who can move their boat, be it kayak or canoe, single or crew boat, faster over distances ranging from 200m to 26 mile marathons and beyond. All our training is aimed at that long-term goal.

### ► The Process

It is clearly accepted by physiologists that people cannot 'play' themselves into good shape for their sport, whatever sport it is.

*Paddlers cannot paddle their way into best shape for being elite kayak and canoe paddlers.*

It is necessary to do specialised training to develop certain qualities required in the sport, as well as working on the skills necessary, if they are to develop to a high level and avoid injury.

In canoe and kayak racing there are a variety of ways of approaching this process of development and the balance will vary at different times of the year and with different age groups. Ongoing reference to the earlier Train to Train and Train to Compete training progressions is necessary here.

● **Strength** is identified as a crucial area for moving the boat faster.

● **Endurance** is a crucial area as all racing competition is over a distance that is heavily endurance oriented.

● **Coordination** is essential as paddling is a highly technical skill.

● **Functional Stability and Functional Strength.**

The general thrust here is to develop a more functional approach to conditioning, in turn enabling a more holistic approach to a paddler's overall strength, power and flexibility development. This enables the paddler's body to use the strength and power gained more effectively in moving the boat.



The muscle that paddlers develop must therefore be muscle with the necessary qualities of endurance, speed and coordination if paddlers are to be successful. Muscle bulk alone does not make paddlers go faster or have better technique.

**To this end, the essence of strength development can be split into two areas:**

- Building more muscle - structural hypertrophy.
- Refining the qualities of that muscle to make it useful for propelling boats quickly, in terms of endurance, speed, power and pure strength and coordination - functional hypertrophy.

*As in most sports, the need is however largely for power.*

🔴 **Strength** is merely the ability to move a load.

🔴 **Power** is the ability to move a load quickly.

## ALL-ROUND ATHLETES

Coaches of younger paddlers are looking to create all round athletes in the 9 -13 age range, Start and Development and early Train to Train phases for boys.

Paddling in canoe or kayak is an all-body exercise, so paddlers need strength, power and coordination in their upper body, in the trunk and in the legs and lower body. This strength and body stability is the core of the body's ability to move the boat quickly and with good technique.

Most of these qualities will of course be applicable for use in all sports. Therefore the whole body should be trained.

*Gaining a balanced whole body strength at this age is crucial to the future development of the athlete and their general health.*

🟢 From 8-12 (notional age for girls) and 9-13 (for boys), the Start and Development phase is the age when the young athlete is prepared for the rigours that future, more intensive training on land, and boat training and competition will put on the body.

This process is much simpler than that for post-puberty paddlers, for most improvements in strength are based around improved neural connections to the muscles. Existing muscle is made more efficient, with better coordination and speed.

🟢 Moving to the Train to Train phase, after puberty, from 12 for girls and around 13+ for boys, is the prime age for developing more muscle

through hypertrophy training, and developing functional strength and stability.

🟡 From 15/18 years and onwards into senior level is the time to continue to build up more muscle, sport-specific strength and power and maintain functional stability.

## ► Where Are Junior Paddlers To Gain Strength?

**Strength can be gained:**

- In the gym - all muscle groups.
- On the water - most muscle groups.
- On land - running/swimming - some muscle groups.

In a paddler there is a demand for highly coordinated muscle with good speed, speed endurance and endurance qualities.

Each sprint race will require the paddler to repeat a load exercise 200 times for 500m, perhaps 400 times for a 1000m and many times more in a marathon.

The load in working a modern wing paddle can be up to 35kg with an elite adult, or even 40kg with a bungee. It may be 20kg in a junior or female paddler.

This load can be easily exceeded in the gym with weights exercises, with consequent gains in strength from the overload, so it is desirable to use periodised resistance training to build up more strength and power as fast and efficiently as possible.

*It is usually seen that increases in strength and power are gained most effectively in the gym.*

## MAKING THE MUSCLE!

The periodisation of good training will devote a considerable proportion of time available from October to January to building muscle and strength. Especially in paddlers who have passed puberty, this will be heavily centred on building more muscle as body hormones will be supporting this process. For girls this is immediately post puberty, but of course is more pronounced with boys from 12-18 months after puberty onset.

Coaches will need to be aware of this process of hormonal change in their athletes and react to it in well prepared paddlers, by increasing strength training accordingly.

*There will never again be such a receptive time to build muscle!*

Coaches are advised to keep a close record of individual height on a weekly basis so they can recognise the onset of puberty in their athletes, and adjust their programmes accordingly.

There is evidence that younger athletes also produce some small increases in muscle before puberty, though most improvements here are neuro-muscular.

### ► Training The Muscle For Power!

From January onwards, both in the gym and on the water, that muscle will need specific training to increase its endurance and speed qualities and create power.

If this is neglected the paddler will be 'stronger' but this will not translate into power and paddling speed. In an extreme case of bad periodisation the paddler may just have acquired muscle bulk and the ability to move more weight slowly, and be slower on the water than before – something that has given strength training an anecdotal bad reputation in the past.

### ► Maintenance Of Strength

With the paddler well prepared for racing, using the new muscle acquired over the winter, the racing season will need to have time set aside to maintain that strength and power.

As the load on the paddler in the boat will always be less than that possible in the gym, the paddler will tend to gradually lose strength during the racing season unless gym strength maintenance training is carried out twice weekly at least.

This cyclical pattern over a period of years will see the paddler increasing the amount of muscle but translating this into boat speed on the water.

## PROGRESSION AND REGULARITY OF TRAINING

*As in all training, progression is of vital importance for improvement.*

In strength and resistance training, stressing the muscles will cause change as long as that process of stress is progressive and is repeated often enough.

*To ensure that the muscle reacts to the stress by changing, these muscles must be re-stressed at the level worked at, within 72 hours approximately, if there is to be improvement.*



After 3 days there is full recovery.



After 4 – 5 days the effect is lost.

The implication is that the stressing of the muscle, i.e. the resistance training sessions, must take place ideally 3 times a week or more.

If only two sessions are completed each week, then only in younger juniors below puberty will this be a tolerable situation.

*Two sessions or less for older juniors and seniors, and the effect will certainly be one of strength maintenance not strength improvement.*

The muscle stress that prompts change and more muscle to develop or become more effective will also be dependent on the stress remaining at a high enough level. In the 3 sessions per week therefore, the load or number of reps must always be aimed at pushing the athlete to demand change from his/her muscles.

Junior elite athletes will be able to tolerate a maximum of 4 strength development sessions per week.

Potential elite level athletes will manage 5 sessions within a balanced programme.

All athletes at any age should move from one level of training to another in stages.

A 16 or a 21 year old will be badly advised if he moves from 1 - 5 sessions a week without a series of stages in between.

Moving from 1 - 3 sessions, 2 - 4 sessions, 3 - 5 sessions is recommended as being appropriate.

The coach is crucial in monitoring this process and encouraging the athletes to push themselves to new higher levels in a safe environment where progression is controlled, well recorded and informed.

### Two extremes will need to be dealt with:

- Very competitive groups of often male athletes may push themselves to increase loads too often and by too much. This will need to be restrained to allow the body to adapt and prevent injury.
- Some athletes will be content to keep loads at the same level because it is easier or less 'painful'. They will need to be motivated to go for bigger loads and more intensity if they are to develop strength.

## MATCHING THE TRAINING TO DEMANDS OF PADDLING

It is vital to make execution of exercises match what we are trying to encourage in the paddler.

This implies:

- ⦿ Executing exercises with emphasis on powerful movement. A 12 reps sessions should run at 1 second per rep. Slow exercising encourages slow reacting muscles and has little or no place in our preparation of athletes.
- ⦿ Extension of arms etc. should reflect the movements needed in paddling technique.
- ⦿ Good technique, e.g. both arms working symmetrically and in a controlled way in Bench Press encourages the coordination requirements of paddling.
- ⦿ Isolation of parts of the body, e.g. locking body on a pull down machine encourages the necessary upper/lower body contrary movement skills.
- ⦿ Any sloppy technique in the gym will replicate in sloppy paddling on the water.

## ► Programme Duration

### ✔ Start and Development (Pre-puberty level) 8 to 12/13

For these athletes the strength development programme may take place throughout the winter with periodisation looking for maintenance only in the racing season.

### ✔ Train to Train (post puberty, puberty) 12/13 to 15/16

Hypertrophy and strength development demands programmes of a minimum of 6 weeks, perhaps up to 8 weeks before a change of emphasis is required. This usually implies one hypertrophy phase per winter, followed by work to build maximum strength, speed and endurance. It is possible to run 2 cycles in one year but this is usually precluded by competition demands.

### ✔ Train to Perform - 15/16 to 18-20

Once again the basis of one structural hypertrophy phase followed by maximum power and endurance strength phases that are tailored to the competition programme is the effective layout. Maintenance throughout the racing season is essential. Coaches will need to be more specific in planning individual programmes that reflect the strength development needs of individual athletes at this stage.

## ► PSYCHOLOGICAL SKILLS

*Confidence, inner calm and my strength and belief in myself all come from working hard to prepare for performance. I think areas such as pre-race visualisation are the key to secure this confidence. It ties everything together. I think it is a very important area to master as a junior.*

*Ian Wynne (GB and Olympic Bronze medallist in K1)*

Most coaches acknowledge that mental skills are an important aspect of top performance and need to be developed along with technique, strength and fitness. A guide has been prepared by sport psychologists who work with sprint and marathon athletes, from junior to World Champion ability. It contains some basic reference material and ideas for how you can incorporate essential mental skill development into regular training sessions. It is not a comprehensive guide – there are plenty of these already. What they have tried to do is distil the essentials and make them very sport-specific.

The skills are presented under a number of topic headings, but in fact they are all interrelated. Developing more effective goals, for example, is an essential aspect of a successful race routine which in turn helps improve concentration and builds confidence. Whilst the material is pitched at juniors, the content is applicable to competitors at all ability levels.

The full manual was written by Sarah Cecil, Tony Gleadell, Jonathan Males and Ian Rospin. It has one version for the athlete and one for the coach.

The contents cover Self Confidence, Goal Setting, Concentration, Imagery, Relaxation and Emotional Control, Race Routines, Team Building.

The BCU offers training workshops to support coaches to understand their paddlers' needs and support them in learning these vital skills.

Resources and details of courses can be obtained from National Development Coaches at the BCU.

Chapter 3 Psychology summarises the issues raised in the full manual and below I have included the more racing specific issue of team building.

## RACE ROUTINES

Race routines improve the consistency of performance by removing variation. A good routine focuses attention on the right factors and enables learning by

making it easier to identify the impact of any changes. Routines should incorporate all the relevant physical, technical and mental elements of a race performance. By having a clear plan, the paddler is less stressed, more relaxed, and can feel more confident that everyone is in place for a good performance.

A good routine should be simple and adaptable to all races. There needs to be some flexibility and the ability to deal with unexpected events. It's important to be clear about the real priorities in a routine, so that if a routine is disrupted, the disruption itself doesn't cause additional stress. Over time the routine should allow the paddler to become increasingly autonomous and less reliant on you, support staff or parents.

An effective race routine starts at least a day before the race and needs to pay attention to diet, sleep and travel arrangements. On the day of the race the routine should allow time for boat preparation and physical and psychological warm-up.

The routine should include a specific race plan for the events. The race plan is formulated in consultation with the coach and includes technical, physical and psychological components.

After a competition, spend some time to review your performance and your race routine. Discuss with your paddlers what worked well and what they might want to change. Remember, there are two types of error - errors in decision and errors in execution. The same applies to race routines - a paddler may have chosen to have done the right thing but executed it poorly, or chose to do the wrong thing but executed it well.

## TEAM BUILDING

Although canoeing is largely an individual sport (except crew boats) team relationships off the water can have an impact on paddler's self-confidence and performance.

Any team has 'norms', which are unwritten rules of behaviour that are just as significant as any formally agreed rules. It's important that team mates have shared expectations about acceptable behaviour within a team, relating to, for example, punctuality, bad mouthing others, leaving training areas tidy and managing a bad training session. This becomes particularly important during team trips when paddlers are sharing accommodation and eating together, when lack of agreement on room etiquette can be a major source of unnecessary stress.

Achieving high quality training can often demand mutual support between the training group and/or the coach.

Smoothing the way - the key is listening effectively and being sensitive to others' feelings.

As a coach you are an important role model for the way people communicate within a squad. It's particularly important for you to set the right tone regarding humour. Banter and 'taking the piss' is inevitable in any group of energetic, fit, and ambitious athletes, particularly young men. Where the humour is predominately good natured it leads to greater team spirit and can defuse tension. Some humour, especially sarcasm, is instead used as a way of establishing and maintaining a 'hierarchy' in the group and can lead to resentment and a loss of confidence amongst those who are the targets of such 'humour'. Pay attention to the banter in the team and be very clear about what's acceptable and what's not.

One essential skill that you can demonstrate and encourage is Effective Listening, which involves:

- ✓ Restating and summarising to show that you have understood what the other person has said.
- ✓ Using appropriate 'non verbal' signs such as nodding, looking at the person who's speaking, and the occasional 'uh huh'.
- ✓ Openness to new ideas/ways of doing things.
- ✓ Making the time to really understand others' point of view rather than assuming you know what they mean.

## CONTRIBUTORS

*Thanks are specifically due to:*

*Barney Wainwright (BCU World Class Sports Science)*

*Steve Train (Fladbury Paddle Club and BCU World Class Coach)*

*Narelle Sibte (formerly of English Institute of Sport)*

*Joanne Elphinston (Elphinston Performance)*

*Graham Campbell (BCU)*

*Sarah Cecil (St. Mary's Twickenham)*

*Ian Raspin (BCU World Class Coach)*

*Tony Gleadell,*

*Jonathan Males*

*Many other BCU and BCU World Class staff*

## RESOURCES

*Resources and workshops available for the Racing Coach from the BCU National Development Coach for Slalom, Polo and Freestyle, and the BCU National Development Coach for Flat-water and Wild Water Racing.*

*(These resources are sometimes only available at an approved workshop).*

*Functional Stability for the Paddling Athlete CD*

*Strength and Resistance Training booklet*

*British Weight Lifting Association Training Manual*

*Strength and Conditioning CD*

*Teaching Technique in Kayak booklet*

*Racing Canoe Paddling booklet*

*Circuit Training for Racing booklet*

*Warm-up and Recovery booklet*

*Medicine Ball Training booklet*

*Video use and Dartfish software*

*Library of training sessions and analysis CD*

*Programme Setting Software CD*

*Psychological Skills*

*Mental Training*

*LTPD the BCU pathway*

*BCU/Joanne Elphinston*

*BCU*

*BWLA*

*BCU/EIS*

*BCU*

*BCU*

*BCU/Imre Kemecsey*

*BCU*

*BCU*

*BCU*

*BCU*

*BCU/Chris Jones*

*BCU*

*Imre Kemecsey*

*BCU*

## GRAHAM CAMPBELL

Graham is a L4 coach, specialising on the placid water and Racing side. He worked as a volunteer coach for nearly 20 years and for 4 years as National Development Coach for flat water. While coaching international juniors and seniors, he developed his interest in teaching technique and worked with top international coaches to search for the most effective way of introducing these high level skills.

He has recently retired to France, but is still involved in coach development.

