PADDLE STRONG

Kayak Specific Strength Training

Preview

Matty Graham
Sport Scientist and Performance Coach

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Exponential Performance Coaching

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Disclaimer

This e-plan is for educational purposes. The publisher, author and contributors of this instructional book are not responsible in any manner whatsoever for any adverse effects arising directly or indirectly as a result of the information provided in this book. If not practiced safely and with caution, strength training can be dangerous to you and to others. It is important to consult with a professional fitness instructor before beginning any training. It is also very important to consult with a medical doctor prior to training due to the intense and strenuous nature of the techniques in this plan.

This is an edited preview and contains insights into different aspects of the Paddle Strong Package.

Please note page numbers and order of content does not match the actual product.

Foreword

The first time I ever stepped into a gym was in 2006. A basic standard gym, with a trainer who gave me a full body, non specific training program. I told the trainer that my reasoning for going to the gym was to become fitter and stronger for Surf Ski paddling. I was 15 years old and had just learned to paddle. I knew after the first week of paddling it was going to be harder and more physically demanding than any other sport I had competed in.

Weeks went by and I wondered why my gym program never seemed to have any upper body exercises to help with my ski paddling. I was doing leg press and one legged balancing drills, then finishing with fifteen minutes hard on the rowing machine. I talked to the trainer and asked why I wasn't doing arm exercises. He said "well since you are a rower, I'm mainly focusing on the specific muscles to help you with that".

I then realised that ski paddling and kayaking in general were so far off the radar in the fitness industry, that this trainer didn't even know what it was. I left the gym and decided to do my own strength training at home with my Dads mini bench press kit and a LOT of push ups.

After I left high school I went on to become a personal trainer with the upmost intention of giving sport specific training to every athlete I could. Unfortunately that is not how a gym operates. I soon found myself teaching standard, non-personalised training sessions. By now I was 19 and getting into sprint kayaking very seriously, and even though I was a trainer who knew a thousand exercises, even my own gym training was random, unspecific and very general. I decided if I was just all round stronger I would go faster.

I met Matty Graham in 2011 at a kayak training camp in Twizel, I thought "what does this guy know about training let alone kayaking? He isn't even big, and he likes bikes, must be a multisport poser". It turns out Matty knows an unbelievable amount about kayaking, training, and everything to go with it. Matty gave a presentation about the energy systems, training programs, and recovery techniques and related it all to kayaking! I was blown away. To me kayaking was on the water, and on the land was weights, yet here he was standing in front of a group of kayakers linking it all together.

From then on Matty helped my coach Barry, and myself produce specific training and recovery plans to optimise my performance over 1000m sprint. I was paddling well on the water, I was even monitoring my recovery and stretching often. But my gym training was still random, high intensity 'hard core' training, still beneficial, but not specific or an optimal use of my training time.

For two nationals in a row I managed to make the A finals for my age group and come away with some medals in the team boats. I was paddling personal best times and enjoying it. Since then due to a kidney disease I have had to stop paddling competitively but with Matty's help and guidance I still managed to perform at a national level with this kidney disease.

In 2013 Matty approached me with an idea for a kayaking specific strength training book. After paddling for 8 years I had never seen any gym program that is specific to kayak paddling let alone a book and I was super excited to get involved. Remember half the people I talked to about my sport still thought I was a 'rower'. No doubt if you are reading this you have been asked the question "Oh, did you have a good row today?". I know I have hundreds of times. So a kayaking specific book excited me hugely.

This book is a comprehensive guide to strength training and conditioning specifically for kayaking. Whether it be sprint kayaking, surf ski paddling, multisport paddling, white water kayaking, or recreational paddling this book will be your strength training bible and I genuinely believe this is the missing puzzle piece in a lot of kayak based athletes training routines, as it definitely was in mine.

Enjoy this rare piece of kayaking knowledge and use it to complete the puzzle in your kayaking program. Good Luck.

Ryan Shanks

Acknowledgements

Not being able to sleep late one night I lay there pondering a number of questions I had been asked via email that day by two different athletes. They did not live in the same city I it and they were enquiring about strength training for kayaking. Thinking about how I was going to respond to these emails I was compelled to get up and start tapping away on the key board. After a half page email to each of them addressing the different questions I was only just scratching the surface of the information I wanted to get across but I pressed the send button to be done with the subject and returned to bed. Later the next morning both athletes had emailed me back separately with more questions, specific questions about what exercises should they perform. How was I going to explain this to them? These exercises were not exactly mainstream and their technique was critical. This sparked the idea for Paddle Strong. A complete resource that any paddler could pick up and step themselves through a smart strength training plan and get real results from it.

It has been a lengthy process with a number of starts and stalls along the way. A big thanks goes out to Ryan Shanks who has helped keep the project rolling with his passion and providing great technical demonstrations of the exercises. Also to my wife Lily and daughter Elsie who are always supportive in everything I do. The biggest thanks goes to all of the athletes, beginner through to elite that I have had the great fortune to work with and your willingness to embrace new ideas and experiment with your training. There is no text book or resource that I have learnt more form than all of you.

The cooperation of Otago Polytechnic's Institute of Sport & Adventure and Absolute Health and Fitness Dunedin in the use of their high quality facilities for the exercise demonstration photography is greatly appreciated.

I hope everyone who reads this is able to benefit greatly from the information contained within.

Paddle Strong

Matty Graham

About The Author

Matty Graham is a Sport Scientist and Performance Coach based in Dunedin New Zealand. He bases his training and coaching approach on a combination of high level sport science education and practical experience.

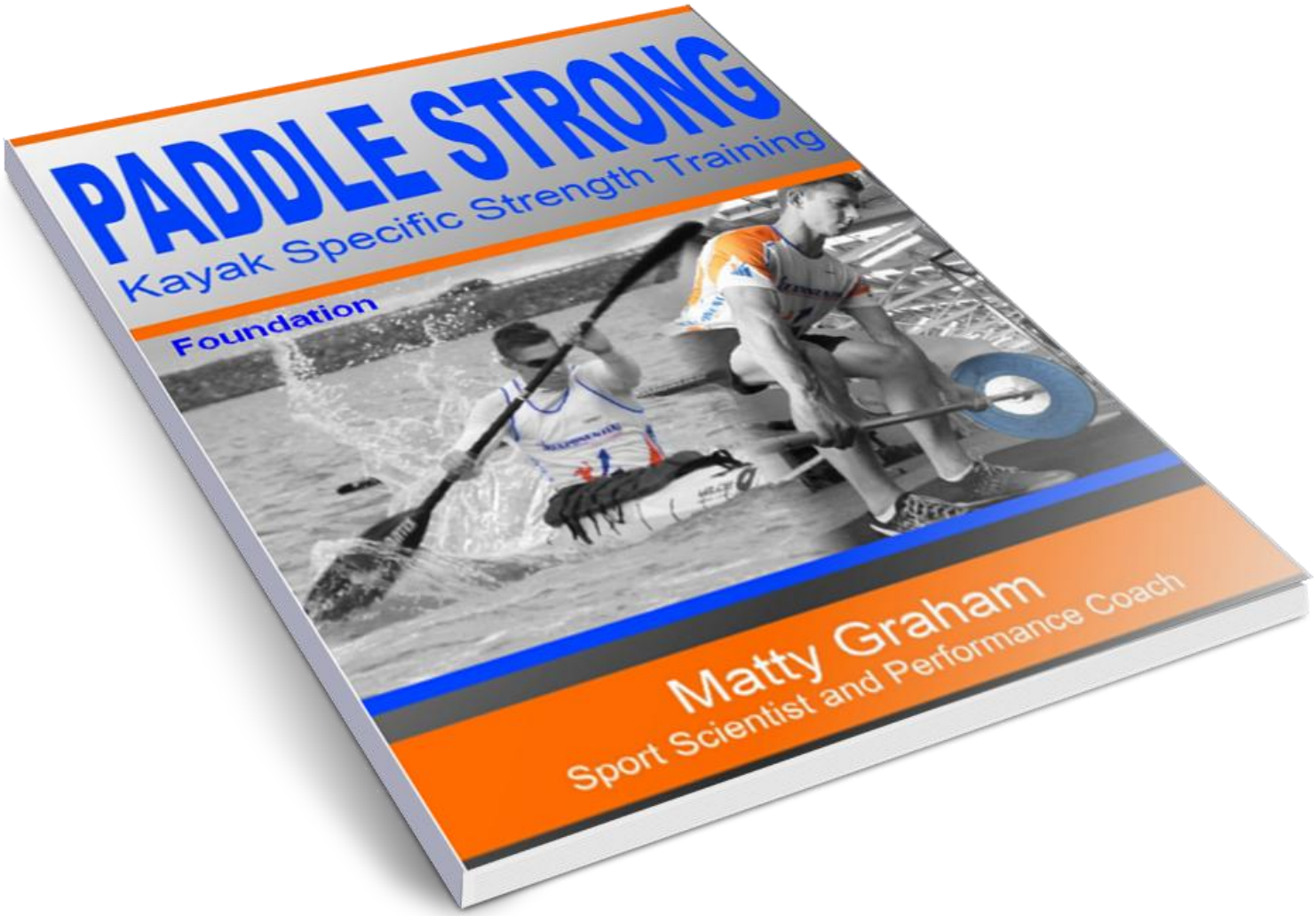
Studying for six years at the School of Physical Education at the University of Otago majoring in sport science and then completing a master's degree in Physical Education, specifically focusing on exercise physiology and how blood volume is regulated in responses to endurance and repeat high intensity training.

He found that there was a real lack of evidence based training and coaching available to athletes. With many coaches relying solely on their past experiences in sport, how they were coached and on traditional training approaches. Wanting to share his passion for sport and knowing there was a better way that could benefit athletes he established Exponential Performance Coaching in 2009 with the aim of providing effective cutting edge training support to help athletes of all levels to perform at their peak and achieve their goals.

Along with his education, Matty has nine years of experience working with over 300 different individuals in achieving their sporting goals. This includes working with beginners through to elite athletes, Olympic and World Champ medallists in the sports of multisport, triathlon, adventure racing, road cycling, track cycling, mountain biking, kayaking, running and team sports.

Matty has worked as a sport science consultant for Canoe Racing New Zealand at training camps and for BikeNZs elite track cycling programme. For two years he was the sport science consultant and strength and conditioning coach for Otago Hockey for the male and female under 21 and NHL hockey teams.

Matty is not all talk though. He has over 10 years of experience competing in endurance sports, mainly multisport, adventure racing along with the individual sports that make up these events. Pushing his physical and mental limits is something he is extremely passionate about and his life goal is to share his knowledge and help as many people as possible to achieve their goals.



In this ebook you will learn the anatomical and physiological principles to help you understand the WHY behind your training. This coupled with a fully periodised outline, specific performance tests and nutrition notes equips you with all the knowledge you need to know to get the most out of yourself.

Introduction

Welcome to Paddle Strong. The aim of this e-plan is to provide you with the information required to improve your on-water kayaking performance through smart strength training.

There are a lot of misconceptions and fears that kayakers have about strength training. Many of these stem from the body building industry and gym culture that create images of gigantic, muscular individuals that struggle to move, let alone perform any great feats of athleticism. Kayakers are not body builders and their training in the gym needs to reflect that. No matter if you are a K1, marathon, ski or multisport paddler, if you apply the information in this book and integrate specific, well planned strength sessions into your training you will improve your kayaking performance.

Before we get into things, let's have a think about kayaking performance. No matter if you are a sprint or endurance paddler improving kayaking performance is all about going faster. While the absolute speed varies between events at the end of the day going faster is why everyone puts in the hours training.

Speed is a function of distance and time. $v = \frac{d}{t}$, where v is speed or velocity in the physics world, d is distance and t is time. So if you want to cover a set distance, be it 200 m or 20 km , the time taken to do this is directly related to your average speed. To improve your speed, you need to improve the amount of power you produce with each stroke.

Now, power is a function of work and time. $p = \frac{w}{t}$, where p is power, w is work performed and t is the time in which the work was performed. In kayaking this equation can be translated to $p = f * V$ where f is force (how hard you pull on the paddle) and v is velocity (how fast you paddle or your cadence). By increasing either of these factors you can increase power and therefore your boat speed. Smart strength training can directly improve this power output and also indirectly improve it. But how does it do this? Let's have a look.

Strength Training and Kayak Performance

Strength training can be used by kayakers to improve their performance in two ways, directly and indirectly. Direct performance improvements come through 3 main effects which improve the muscles force generation and velocity of movement resulting in an increase of power production (think back to the above equation).

Direct performance improvements

1) Hypertrophy: Hypertrophy is the name given to an increase in muscle size. A larger muscle has the potential to be a stronger muscle and produce more force. This is not always true as there are plenty of big bulky body builders who are not strong. This leads to the next effect of strength training.

2) Neural activation: The size of the muscle is only part of the story. For the muscle to work it must be activated (switched on) by the nerves in the correct sequence and intensity. Strength training has been shown to improve the activation of muscle fibres meaning more muscle fibres are able to be activated resulting in a stronger force of contraction. Improvements in the speed of the neural activation of the muscles can also be gained through strength training which results in the muscles being able to contract faster which directly effects the velocity aspect of the power equation.

3) Fatigue resistance: Strength training can also improve the fatigue resistance of muscles through the use of high metabolic training. This results in the muscle being able to work harder (at a high velocity and high force) for longer before reaching a fatigued state.

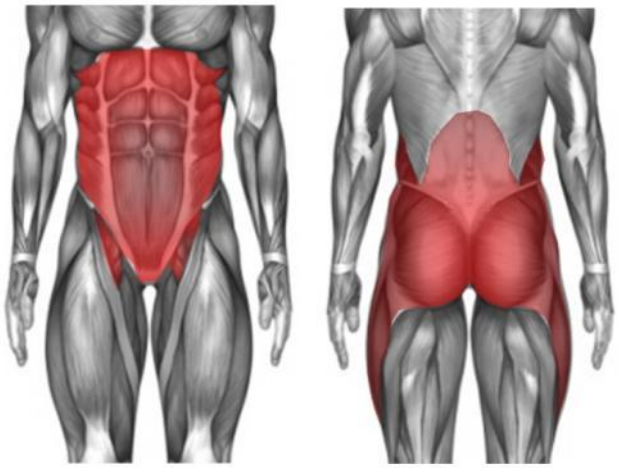
Indirect performance improvements

The other way strength training can improve kayak performance is indirectly. The Indirect performance improvements through strength training are primarily gained through the development of athletes' core stability, leading to improvements in postural control, alignment and an increased injury resilience.

The importance of the 'core'

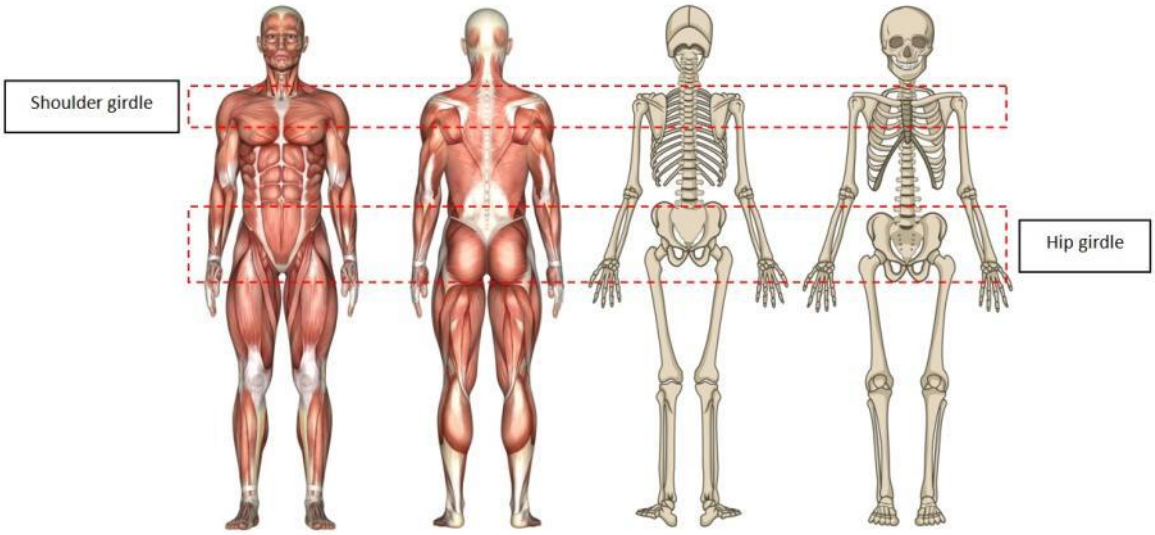
The core is the critical link connecting the two areas of major force generation in the human body (the pelvis and shoulder girdle). Most people think of the 'core' is just the abdominals or the visible 'six pack'. While this is an important aspect of the core it is only a very small part of it. When referring to the core from this point onward we will be referring to the complex that includes the Rectus Abdominis, the Internal and External Obloquies, Transverses Abdominis, Erector Spinae, Iliopoas, Multifidus, Iliocostalis and the Gluteal complex.

Figure 1: *Muscle groups included in core stabilisation*



When you look at the human skeleton, the spine is little more than a precariously stacked ‘Jenga tower’ that the shoulder and hip girdles are hinged off (Figure 2). The only thing stabilising this stack of vertebrae are the muscles, tendons and ligaments of the core. Like guide wires holding up a ships mast or spokes in a bike wheel if any of these ‘guide wires’ or ‘spokes’ are over-tight or loose then you end up with a mast that is on a lean or a wheel that does not run true. Due to the nature of kayaking, athletes end up with tight and over developed muscle groups with others becoming weak and ‘stretched’ out. This imbalance in the ‘guide wire’ tension causes misalignment of the athletes’ posture which over time can lead to injuries through excessive loading of structures that are not designed to be loaded in such a way or direction.

Figure 2: *Muscular and skeletal diagram outlining the shoulder and hip girdle*



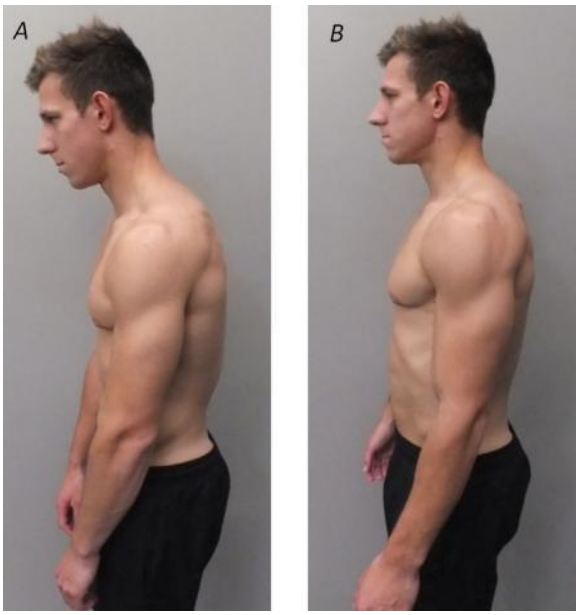
In kayaking the postural support of the core and the transfer of power from the lower to upper body is one of the most important aspects of correct technique. However, it is this aspect that is most often missed in a training programme. Being able to generate force using the large muscles of the lower body and then transferring this force into the upper body and into the paddle blades is the key to making a kayak go fast. For this transfer of force from the lower body into the paddle an individual needs to have a strong core to link these two areas. Because of the large number of joints and muscles involved in the core the coordination of this stabilisation and force transfer can be hard to master. This is exacerbated with 'traditional' core training as some of the large muscle groups of the core become over developed and the small stabiliser muscles become even more inactive. The development of a kayakers core should be the primary focus for athletes of all abilities.

Injury resilience

Improved postural control, along with the strengthening of the ligaments and tendons results in an athlete being more ‘structurally robust' and resilient to injury. This will in turn allow athletes to withstand a higher ‘on water’ training load without developing injuries which will improve their performance.

The posture example in Figure 3, A is a classic example of a kayakers posture. Spending large amounts of time paddling (in a poor position) causes the shoulders and spine to become rounded (kyphosis).The head then comes forward leading to the neck having to arch to compensate for this. When standing with good posture (Figure 3, B) there should be a neutral alignment from the head, down through the spine, into a level pelvis and then down your legs to your feet. Establishing this 'good' neutral posture is the first thing that MUST be established in any strength training plan. Without this, any strength training cannot be maximised and you will open yourself to injury.

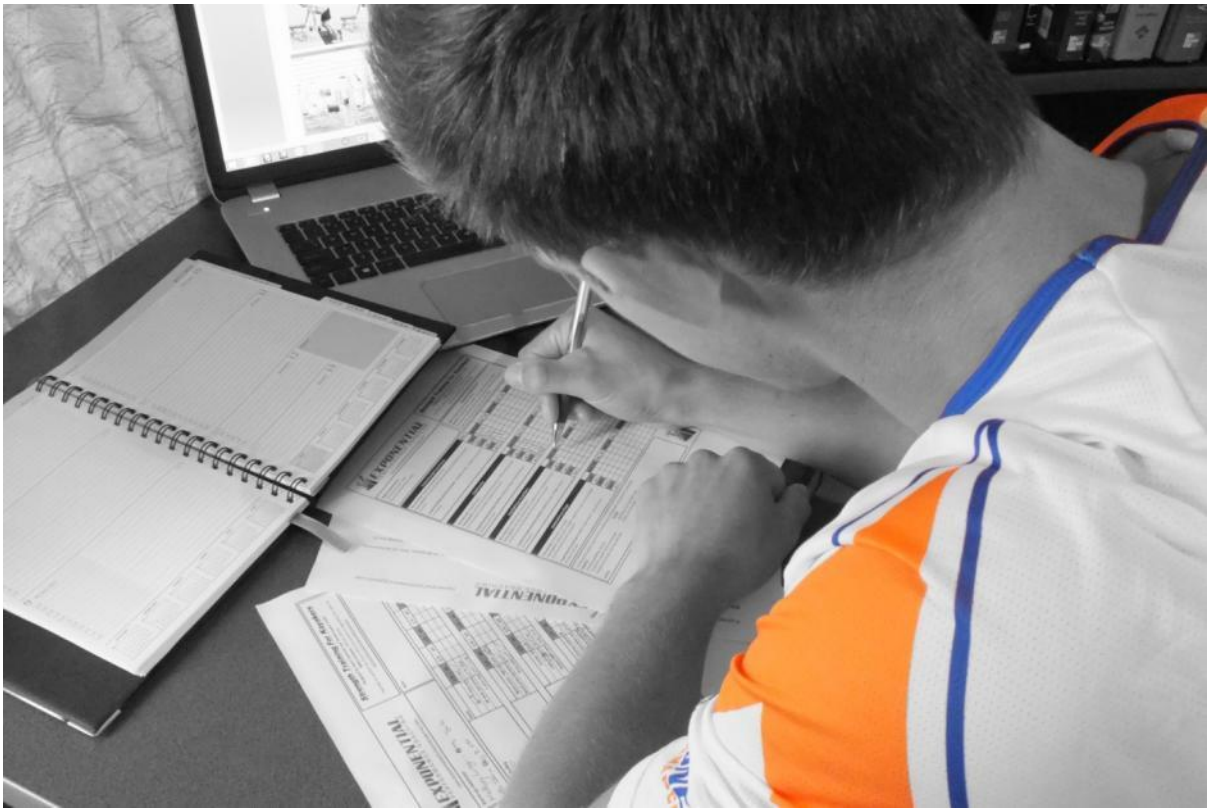
Figure 3: *Example of kyphotic posture of kayak athlete (A) and 'good' neutral posture (B)*



In Figure 4 the muscle groups highlighted in red (pectorals, hip flexors and erector muscle of the spine) tend to become very strong and 'tight' with on-water training. These then pull on the shoulders, rounding the spine and [illegible] muscles highlighted in green of the upper back, abdominals, glu[illegible] not able to counteract this constant tension and these are often the areas in which injury occur or tightness is felt, i.e. sore shoulders or 'tight' hamstrings. These imbalances a[illegible] to day living in the modern world through prolonged sitting, computer work and driving. This further rounds the shoulders, tightening the hip flexors and weakens the [illegible] relatively simple task of maintaining correct posture, then they are going to struggle in the long term to perform in the complex task of kayaking, not to mention their ability to live a long pain free life outside of their sport.

Figure 4: *Muscle groups that become overly strong or 'tight' (red) and those that become weak or 'stretched out' (green) with on-water kayak training.*

Planning



For your strength training programme to be effective it is important that it is well planed and integrated into your on water training plan. As with your on water training any strength training should be progressed through the different training phases, and focus on developing specific areas of your performance to build on the previous training phases. This process ensures your body is ready to progress on to the more demanding training phases that allows you to be in peak condition for your key event or time of the season.

Terms

Before we get into the details of how to implement a structured strength training plan into your training programme there are some key terms that need to be defined.

Repetitions:

Repetitions, or reps for short, define the number of times to perform an exercise. For example 3x10 chin ups means you perform 10 chin ups, then stop. The 10 chin ups you performed are considered 10 repetitions.

Sets:

Sets refers to how many times you will repeat that exercise for the set number of repetitions. In the example above 3x10 chin ups means following your rest after the 10 reps you will perform another 10 chin ups then rest and then finally perform another 10 reps to make up 3 sets of 10 reps.

Rest:

Depending on the aim of the training session the amount of rest you have will be manipulated. Rest is typically measured in time and will be outlined for each exercise set or for the session as a whole.

Combination sets:

In some of the training sessions you will use combination sets which are also known as combos or super sets. These sets are designed to maximise your work rate by moving quickly between different sets of exercises with minimal rest time. As an example you may have a set of 3 exercises that you need to complete 3 sets of 10 reps. Instead of doing 3 sets of exercise 1 and resting between each set then moving on to [illegible] of exercise 2 and finally 10 reps of exercise 3. Then have a short rest [illegible] forming another set of each exercise in succession.

Load:

Load is the amount of weight [illegible] exercises use bodyweight as the load, and others use an external source such as a barbell or dumbbell. The load for each exercise differs depending on the specific training phase and goals. For example for your bench press you may use a load of 60kg for your strength phase and 40 kg for power training phase. To keep track of your training load, record it in your training plan templates to show improvement and keep consistency in your gym training.

Training phases

Introduction phase: This training phase is aimed at developing basic technique, foundational movement patterns and base strength. Strength gains over this phase are primarily due to improvements in the neuromuscular system (i.e. improved recruitment of muscle fibres). During this training phase the load lifted is kept low with the primary focus on lifting technique. Those athletes that are new to strength training will spend 6 - 8 weeks in this training phase. For more experienced athletes this phase is used as a re-introduction phase following an off season to ease them back into to their strength training over a 2 – 4 week period.

Anatomical adaptation phase (AA): This training phase is aimed at preparing your muscles and tendons for the higher training loads of the future training phases. Over this phase the focus is to stimulate muscle hypertrophy which is when your muscle fibres increase in size. A larger muscle has the potential to be a stronger muscle so having some increase in muscle fibre size is beneficial. Many endurance paddlers are [illegible] bulking up. These concerns are unnecessary as the AA training phase coincides with the base endurance phase of your on water training. The aerobic on water [illegible] amount of energy available for dramatic increases in muscle mass therefore the [illegible] will not experience large gains in muscle mass. During this training phase the load lifted [illegible] (60-75 %1 RM) at moderate repetitions (2-5 sets x 10 – 20 reps depe[illegible] large amount of accumulated load to "break it down" so it [illegible] bigger.

Maximal strength phase: Once an athlete has undergone the introduction and AA training phases they are ready to develop their maximal strength. The aim of this training phase to develop the muscles ability to generate a high amount of force. If you think back to our power calculation of $p = f * V$ the focus of the maximal strength training phase is about developing the top line of the equation (force). During this training phase the weight lifted in the exercises is increased (85 – 95% 1RM) and the number of repetitions is decreased (5 sets x 3 - 6 reps). Because of the increased weight the speed of the exercises is also decreased.

Figure 5: *Overview of strength training structure and how to integrate it into your overall training plan.*

Minimum Weeks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Type of performance increase	Indirect performance increase								Direct performance increase									
Training phase	Introduction						Anatomical Adaptation				Max Strength				Power / Hybrid			
Weeks in phase	6 - 8						4 - 5				4 - 6				4 - 6			
Number of sets per exercise	2-5						2 - 5				3 - 6				3 - 5			
Repetitions performed	10 -20						10 - 20				3 - 6				1 - 3			
Subjective weight description	Light						Moderate				Heavy				Light - moderate			
Weight % 1RM	N/A						(45 - 75% 1RM)				(85 - 95% 1RM)				(20 - 60% 1RM)			
Speed of movement	Slow - Moderate						Moderate				Slow				Fast - Explosive			
Rest between sets	Short (30 s - 1 min)						Short (30 s - 1.5 min)				Long (3 - 4 min)				Long (3 - 4 min)			
Strength focus	Development of technique, movement patterns and stabilisation						Hypertrophy of muscle and strengthening of tendon structures to prepare for max strength phase				Increased contractile strength and recruitment of muscle fibres				Movement of explosive force generation and anaerobic threshold to improve on water performance			
On water training focus	Winter base Training						Strength endurance development				Speed and skills summer competitive season							

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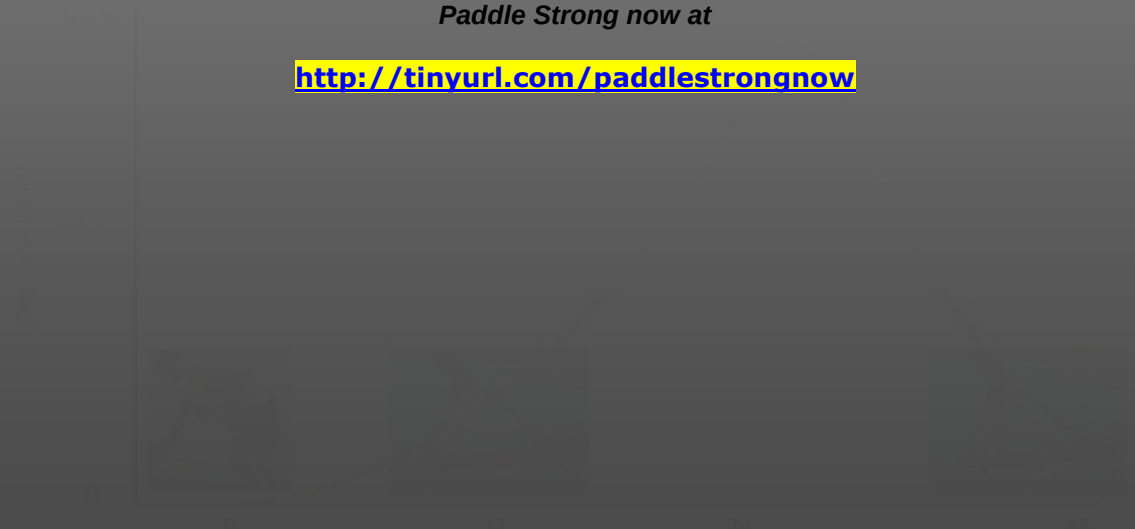
Integrating strength training in your programme

It is important that your gym based strength and on water training are carefully balance to ensure that neither are negatively affected by each other. Heavy strength training causes micro damage (small tears) to your muscle fibres which can result in delayed onset muscle soreness (DOMS) 24 – 48 hours following the session due to the inflammatory process required for the adaptation of the muscles. This DOMS can negatively impact your on water training the following day if the session aims are technique or high intensity based.

To avoid this negative impact it is possible to structure your training so you perform your strength training in the afternoon of one day, then perform your on water session ~ 12 hours later in the morning of day 2. Because DOMS typical sets in ~ 24 hours after strength training, performing your on water session before this time will allow you to train on the water without the associated sore muscles. Also performing your key on-water sessions the day before or the morning of your strength training will allow you to maintain the quality of your on water training without being negatively affected by the strength training. Endurance training is minimally effected by any post strength training 'hang over' so these sessions can be structured around each other with minimal issues.

Figure 6: Diagram of [illegible] training to avoid any negative effects of delayed onset muscle soreness.



A note on strength training and young athletes

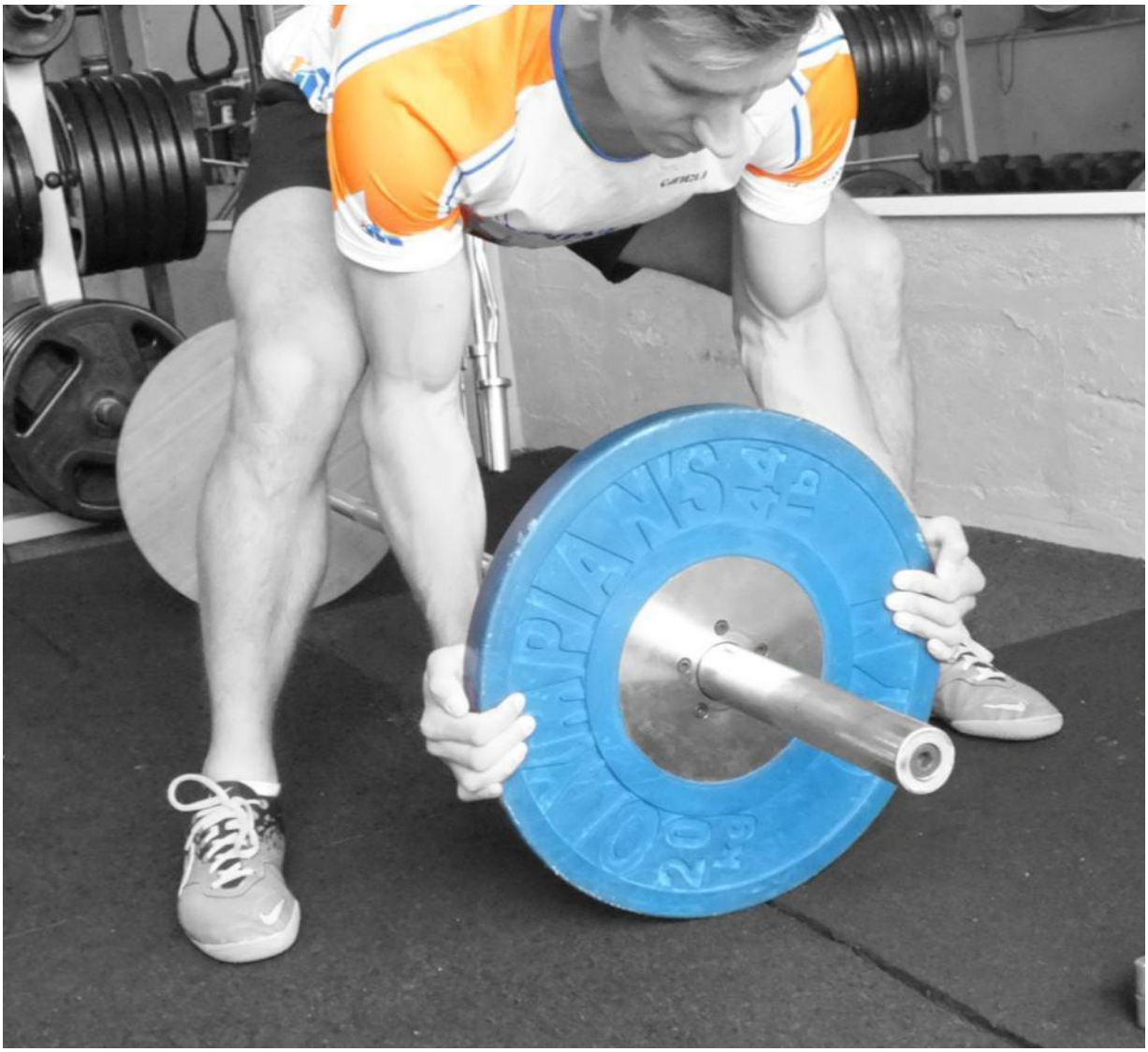
There are always concerns around young athletes performing strength training and injury. As with all activity, exercise or training there is risk of injury but this is minimised through well planned individualised training that is suited to the athlete. Strength training should be no different to how a young athletes' on-water training is planned. It should be tailored for the athletes training age, physical age, needs and level of experience.

For young athletes all of their sporting pursuits should be focused primarily on fun and enjoyment to ensure their longevity in sport and development of lifelong exercise habits. Performing group sessions with friends can be ideal for integrating this 'fun factor' into kayaking which is largely an individual sport.

In the first instance young paddlers should work on their on-water training and then if they show an interest in strength training they can then move into it as required. Once an athlete reaches the age of 16 they can move into an entry-level 'adult' type training plan like the introductory plan outline below. For athletes under the age of 16 any strength training should work on the development of basic technique and movement patterns using body weight and light weight exercises.

A valuable resource for those who are interested in learning more about the planning, progression and management of strength training in young athletes is: Strength Training For Young Athletes by William Kraemer and Steven Fleck. It is recommended that you consult this resource before starting strength training with young athletes.

Testing and Tracking



Why is testing and tracking important

Performing regular tests of your strength and tracking your changes in strength is important to;

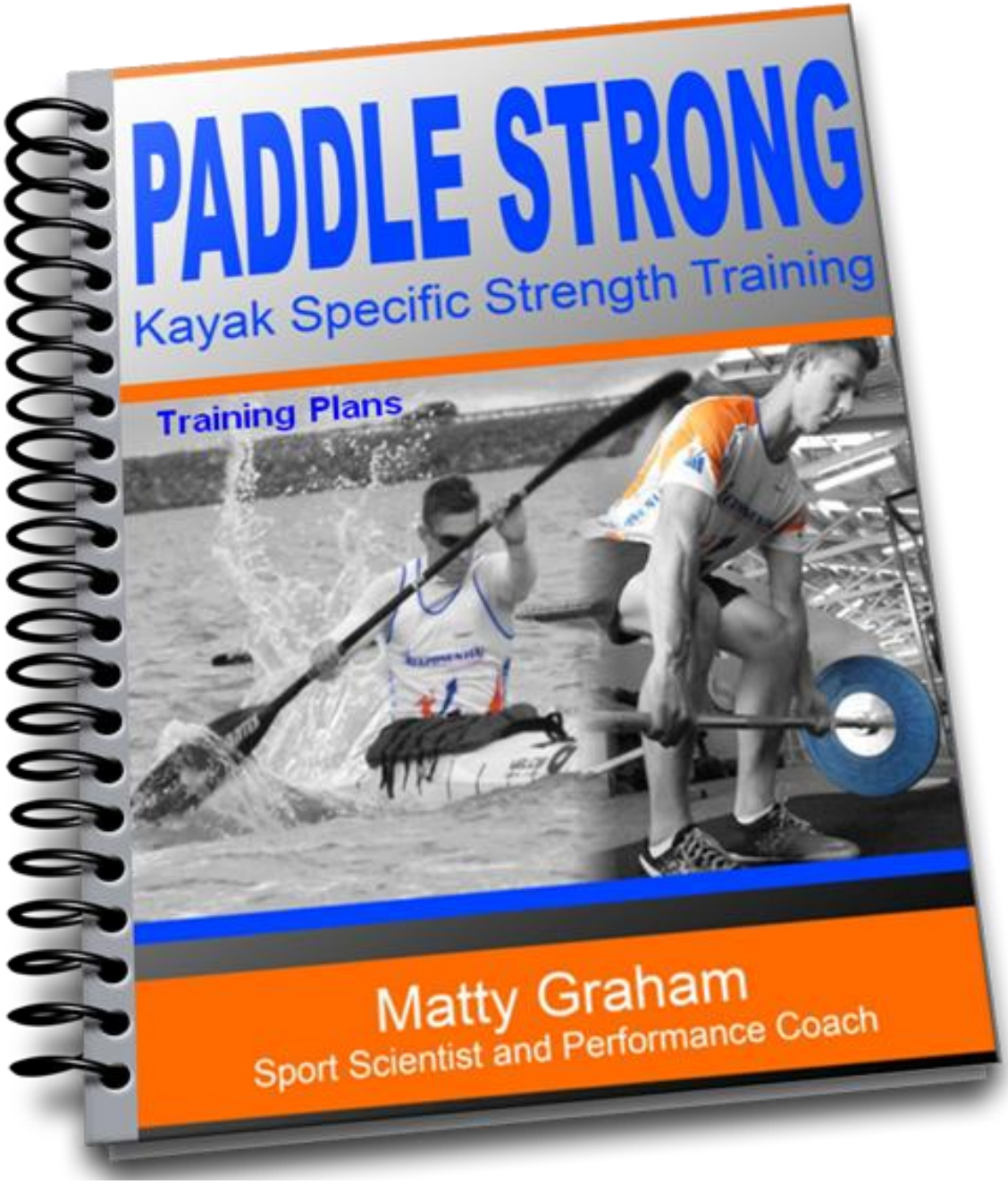
1) Ensure your strength training is working effectively and you are improving. If your strength gains stop, decrease or start to plateau then this is a sign that something needs to change in your training so your body will continue to adapt.

2) Regular testing of different aspects of your strength allows the identification of your strengths and weaknesses in your performance. Building a profile of your strengths and weaknesses as a paddler is important to help you and your coach to develop a focused training plan and guide your training focus.

3) Having an objective performance measure to work towards with your strength training can help maintain your motivation, as it allows instant feedback on how you are progressing to your goal. Once you have established your baseline strength it is time to set some goals focused on how much you want to improve on each of your tests.

Nutrition

While this is a strength training guide, it is important that nutrition is acknowledged as it plays such a critical role in optimal training and recovery. To go too far in depth of what to eat for strength training would bring a whole new book altogether. So the aim of this short chapter is to outline the key, 'real world' nutrition fundamentals that will give you the biggest bang for your buck with your performance.



Six comprehensive easy to follow training plans that provide step up step instructions so you can approach your strength training with the confidence that you are doing the best training possible.

Scroll down to see some more detail.

Training Plans

Below you will find five kayak specific strength training sessions that can be used during each of the four training phases. There is a sixth bonus session that can be used to replace an on-water training session on those days when you cannot train on the water due to weather, time or other factors.

These sessions are planned using a template that can be found in Appendix 3: Training Plans. You can print off these tables and take them to the gym with you to record your sets, reps and weight progression. You can also print off a blank template and plan your own session using the exercise library and the principles outlined in this e-plan.

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Below is an example of the session templates and how to read them/ fill these training tables out.

EXPONENTIAL PERFORMANCE COACHING

www.exponentialperformancecoaching.com

Strength Training For Kayakers

Designed by Sport Scientist and Performance Coach
Matty Graham, *MPhEd, BPhEd*
Feel free to contact me if you have any questions regarding this plan at:
exponential.performance@gmail.com

Description of the session aims and weight guidelines

Warm up exercises to be performed with light weight to prepare for the

Warm up exercises:
Perform the following exercises to warm up the prime movers
- 2x10 kettle bell swings
- 2x10 m walking lunges with dumbbell

Anatomical Adaptation Session
Aim: *Progression of key kayak movement patterns to prepare the muscles, tendons and ligaments for max strength training phase.*
Outline: *Perform exercises in 3 exercise combos using a moderate weight (45-75 % 1RM)*

Record date here to track your progress over

Details of the sets, reps and rest time for the session or different combos

Column to record the number of sets and reps you performed of each exercise

Column to record the amount of weight you lifted for each exercise

Combo 1: Pulling
- Perform 2-4x 10 - 15 reps, moving between each exercise with minimal rest.
- Rest for ~ 1min at the end of the 3 exercise combo

Date	2/9/13		4/09/13									
	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt
	2x10	/	3x10	/								
	2x10	12kg	3x10	15kg								
	2x10	15kg	3x10	20kg								

Combo 2: Pushing
- 2-4x 10 reps with minimal rest

	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt
	2x10	30kg	3x10	30kg								
	2x10	30kg	3x10	30kg								
	2x10	/	3x10	/								

Combo 3: Rotation
- 2-4x 10 reps with minimal rest

	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt
	2x10	/	3x10	/								
	2x10	14kg	3x10	20kg								
	2x10	14kg	3x10	20kg								

Combo 4: Stability
- 2-4 sets of 1-2 min of balancing or 10 reps for the prone hold knee ups

	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt
	2x1min	/	2x1.5	/								
	2x10	/	3x15	/								
	2x1min	/	2x1.5	/								

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Notes of any addition stretching or core work to be done following the main session

Stretching:
Following this session spend 10 min performing some focused stretching holding each stretch for 1 - 2 min and repeating for 2-3 sets.
- SB chest stretch *- ITB stretch*
- Quad stretch *- Glute stretch*

NOTES: *First session went well. Could increase the weight on some of the exercises. 2 sets was a good starting point.*

Area for you to record any specific notes you have about the session or things to remember next time

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Strength Training For Kayakers

Designed by Sport Scientist and Performance Coach
Matty Graham, *MPhEd, BPhEd*
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These sessions are designed slightly differently than the above ones.

These are structured with a key exercise + a supplementary exercise or stretch.

Warm up exercises:
Perform the following exercises to warm up the prime mover muscles
- 2x10 kettle bell swings
- 2x10 m walking lunges with dumbbell

Maximum Strength Session
Aim: *Development of maximal strength in the prime mover muscle groups.*
Outline: *Perform 3 - 5 reps of the key exercises using a heavy weight (85 - 95% 1RM)*

In these sessions there is space to record different reps and weight for the different sets. During these phases of your training the amount of weight lifted is relatively heavy so building up to your max weight for the set is advised.

Date	25/11/13		28/11/13									
	Reps	Wt	Reps	Wt	Reps	Wt	Reps	Wt	Reps	Wt	Reps	
WU	5	20	5	30								
Set 1	5	30	4	35								
Set 2	5	30	5	35								
Set 3	4	35	5	35								
Set 4			4	40								
Set 5												

	Reps	Wt	Reps	Wt	Reps	Wt	Reps	Wt	Reps	Wt	Reps	Wt
WU	5	15	5	20								
Set 1	5	20	5	25								
Set 2	5	25	5	30								
Set 3	5	25	4	30								
Set 4			4	30								
Set 5												

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Introductory session

If you are new to strength training or have not conducted regular strength training over the past year it is important that you start by developing the basic movement patterns and techniques in this introductory session. It is important to get a good handle on these movement patterns and techniques to prepare your body for the anatomical adaptation training phase.

The aims of this introductory session is to;

1. Develop basic movement patterns and technique
2. Develop base strength for injury prevention and joint stability
3. Stability exercises for proprioception development

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Warm up exercises:
Perform the following exercises to warm up your prime movers
- 2x10 Chin ups (assisted or unassisted)
- 2x10 m Walking lunges

Introductory Session
Aim: *Introduction of key movement patterns and technique to prepare the body for the Anatomical Adaptation training phase.*
Outline: *Perform exercises in 2 exercise combos with a Light weight (<45% 1RM) focusing on technique.*

Combo 1:
- Perform 2-4x 10 - 15 reps
- Rest for ~ 1min at the end of the 2 exercise combo

Date

	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt
KB goblet squat/press												
Press ups												

Combo 2:
- 2-4x 10 Bench pull and hold crow
for 30 sec - 2 min depending on ability

	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt
Prone hold												

Combo 3:
- 2-4x 10 reps

	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt
Bent over row												
KB swing												

Combo 4:
- 2-4 sets of 1-2 min balancing as long as possible over this time

	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt	S/R	Wt
SB knee balance												
Shadow paddling												

Stretching:
Following this session spend 10 min performing some focused stretching holding each stretch for 1 - 2 min and repeating for 2-3 sets
- SB chest stretch
- TB stretch
- Quad stretch
- Glute stretch

NOTES:

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This introductory session should be performed 2-3 x per week for 6-8 weeks depending on your ability. As the exercises become 'easier' to perform, progress them by gradually increasing the number of sets and reps performed along with incremental increases in the weight you are lifting. The key is to make small changes often so your body continues to adapt to the training

Explosive Power Session

Now that you have a good foundation of structure and strength it is time to develop your power. Never attempt this type of training without having performed the training outlined in the previous sessions. If you do you risk the chance of injury and your performance gains will be limited.

The explosive power training phase is all about training your muscles to contract at a fast rate. It is critical that during this training phase you focus on performing the movements 'fast' while still maintaining control.

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Warm up exercises:
Normal press ups: 2x10
Normal med ball twist: 2x10

Explosive Power Session
Aim: *Explosive power development*
Outline: *The key for this session is to move as fast as possible focusing on exploding out of the movement. Perform 3-5 sets of 3-5 reps with a moderate weight (20-60% 1RM)*

Seated Med Ball Twist Throw	Date											
Key exercise: *Seated med ball twist throw*		Reps	Wt	Reps	Wt	Reps	Wt	Reps	Wt	Reps	Wt	Reps	Wt
Focus points: *Focus on power and twisting forcefully from the start position*	Warm-up												
	Set 1												
Supplementary exercise/stretch: *Reptilian crawl - Perform over a 10 m distance*	Set 2												
	Set 3												
	Set 4												
	Set 5												

Clap Press Up		Reps	Wt	Reps	Wt	Reps	Wt	Reps	Wt	Reps	Wt	Reps	Wt
Key exercise: *Clap press up*	Warm-up												
Focus points: *Explode out of the bottom as much power as possible, clapping at the top*	Set 1												
	Set 2												
Supplementary exercise/stretch: *Hip flexor lunge - Hold for 30 sec minimum each side*	Set 3												
	Set 4												
	Set 5												

Med Ball Over Head Slam		Reps	Wt	Reps	Wt	Reps	Wt	Reps	Wt	Reps	Wt	Reps	Wt
Key exercise: *Med ball over head slam*	Warm-up												
Focus points: *Use your whole body to perform the movement and put everything into slamming the med ball into the ground*	Set 1												
	Set 2												
Supplementary exercise/stretch: *Walking lunge - Perform over a 10 m distance*	Set 3												
	Set 4												
	Set 5												

Med Ball Chop Chops		Reps	Wt	Reps	Wt	Reps	Wt	Reps	Wt	Reps	Wt	Reps	Wt
Key exercise: *Med ball chop chops*	Warm-up												
Focus points: *Chop down with strength and power and be hard on the end of the motion*	Set 1												
	Set 2												
Supplementary exercise/stretch: *Chest stretch - Hold for 30 sec minimum each side*	Set 3												
	Set 4												
	Set 5												

Following this session spend 15 min performing some specific core work and stretching

Stability	Stretch
- Shadow paddling: 3x2 min	*- Hip flexors: 2x1 min each side*
- Thread the needle: 3x10 on each side	*- Chest: 2x1 min each side*
- Scorpion kick backs: 3x10 on each side	

NOTES:

This explosive power session should be performed 1-2 x per week for 4-6 weeks depending on ability and on-water training. Careful attention is required over this time to balance your recovery from your high intensity on and off water paddling.

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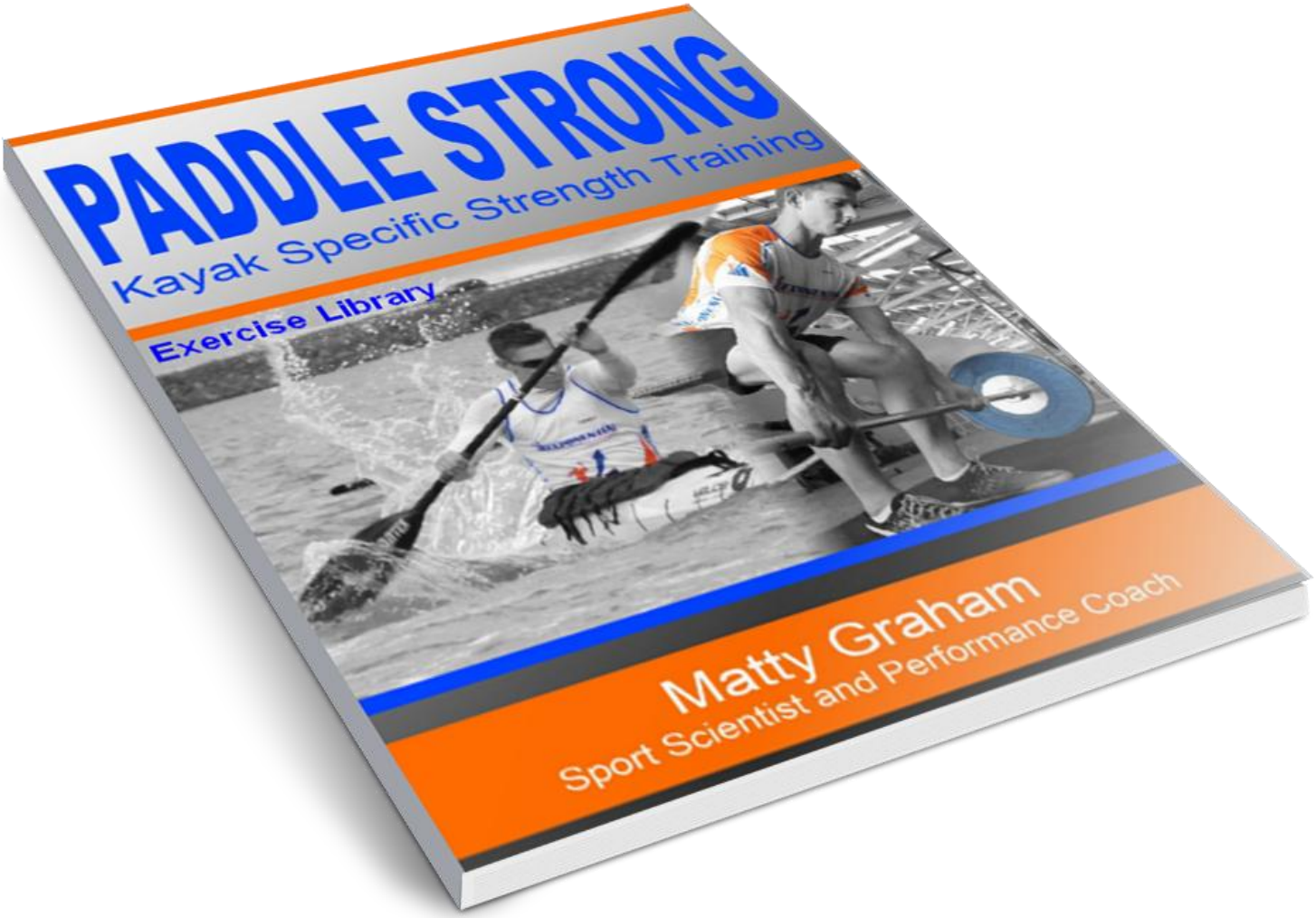


Technique in the gym is critical for safe and effective strength training. With over 100 photos and clear technique cues, this exercise library outlines the exact exercises you need to perform in all of the training Paddle Strong plans.

Scroll down for an inside look.

Exercise Library

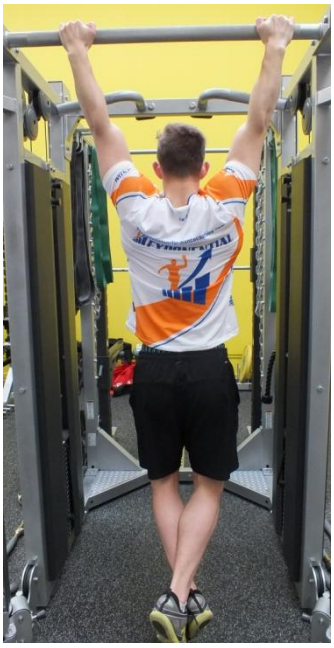
The library that follows outlines all of the exercises used in the training plans provided in Paddle Strong. This is not an exhaustive list of strength exercises. Instead these are the exercises that will give you the biggest performance improvements in your kayak for the time you spend in the gym. Likewise the key focus points are designed to provide easy to understand cues that can be matched with the photos to allow you to perform the exercises with good technique.

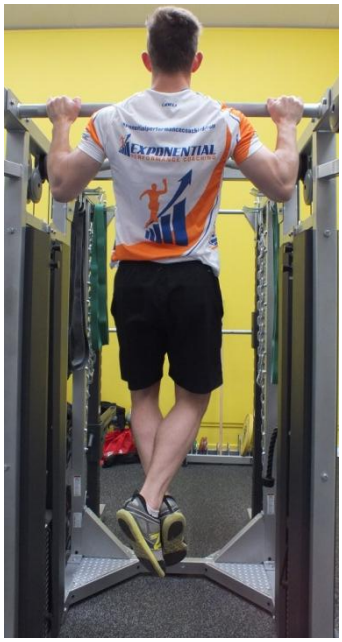
Chin ups

Chin ups are one of the key exercises for kayakers. Many people struggle to perform these so below there are three different chin up options depending on your ability. If you struggle with the standard chin up start one of the assisted versions so you maintain good form and technique.

Focus points:

- Keep your head neutral (look straight ahead). Do not lift your chin up to try and reach the bar.
- After completing a rep, don't hold yourself up there longer than you have to. A lot of people waste energy trying to lower themselves down very slowly. The benefit is in the pull UP. So control your body down, but not so slow that you are using all your strength and energy.

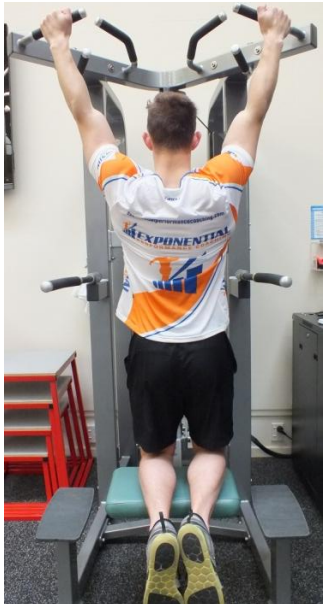




Chin ups – Machine Assisted

Focus points:

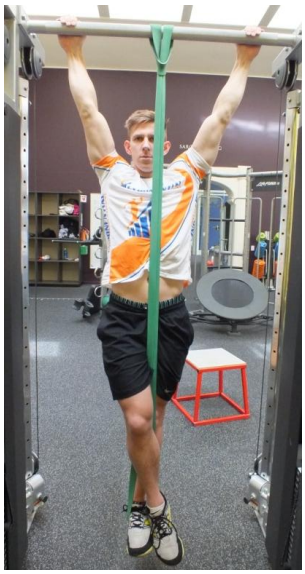
- Keep your head in a neutral position.
- Think about squeezing your shoulder blades together, this will activate your lats.



Chin ups - Band Assisted

Focus points:

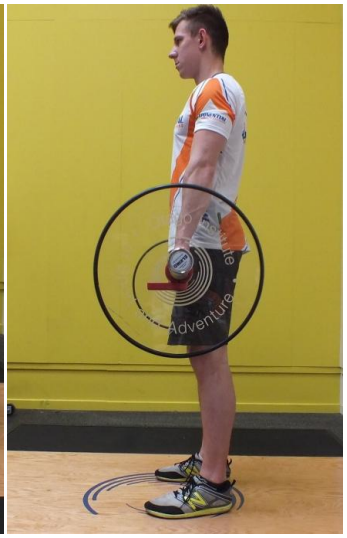
- Place one foot in the band so it is easy to get in and out of. Have a box or chair near the bar to help.
- Cross the other leg over the front of the band to hold it in place.
- The band should track up the middle of your body to assist the pull load evenly.



Deadlift

Focus points:

- Set your feet up under the barbell with your shins almost touching.
- Keep lower back straight in the set up, and right throughout the movement.
- As you lift the bar, keep it as close to your legs as possible without touching on the way up.
- Try and open your knee and hip joints at the same time for maximum efficiency and injury resilience.
- Always lower the bar back down with the same technique used to lift (straight back), think of it as a 'backwards lift'.



KB Swing

Focus points:

- Maintain a neutral head and straight back.
- Bend from the hips and knees, thrusting your hips forward to produce the power.
- The outside of your wrists should touch the inside of your legs at the start position.
- Control the kettlebell up to just past eye level.
- Bend from the hips and knees to get back to the start position.

Med Ball Over Head Slams

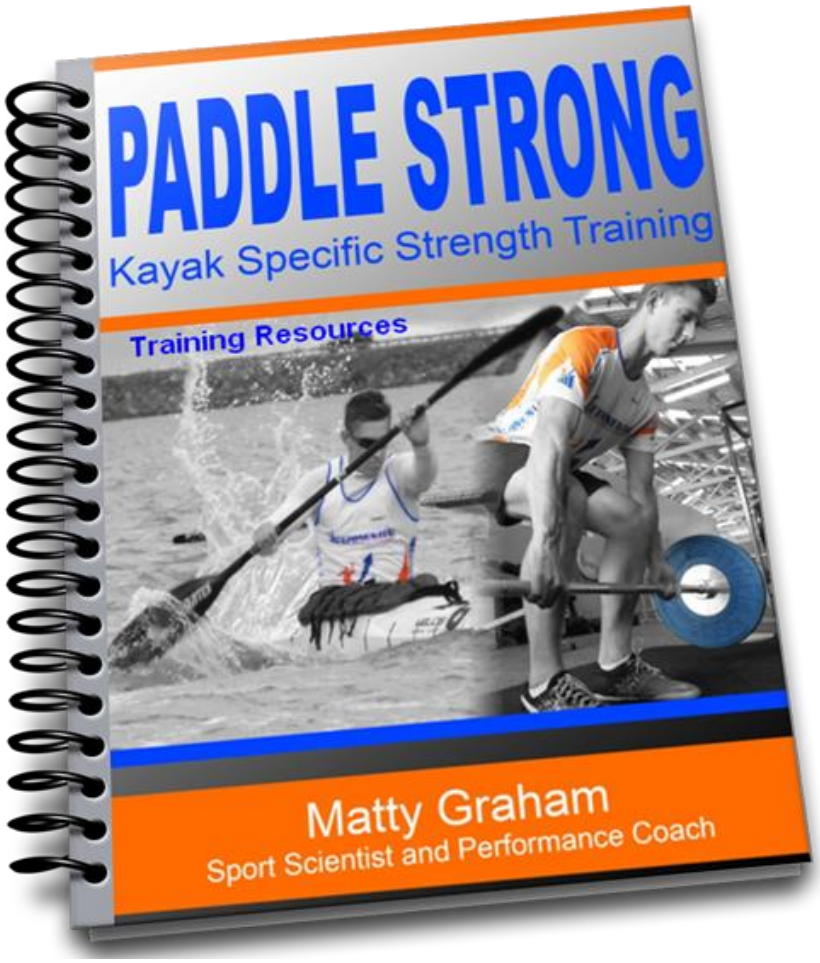
Focus points:

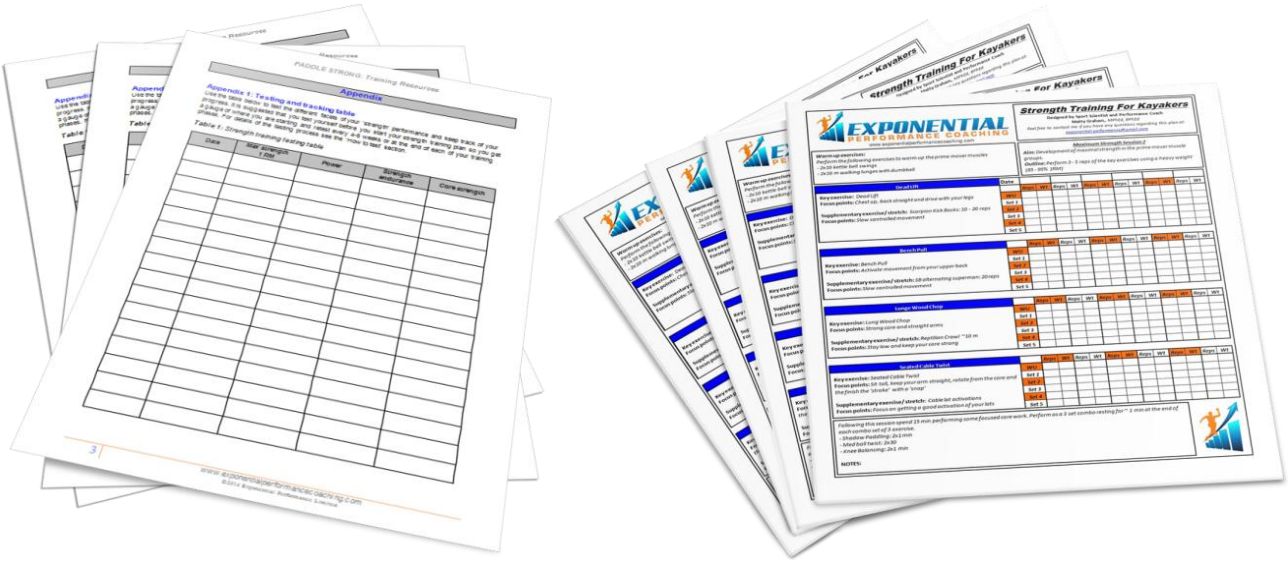
- Start the movement with the ball over your head.
- Slam the ball into the floor as hard as you can while bending your legs to produce power.
- Follow through with your arms after you release the ball into the ground. Catch the ball as it bounces back up and go straight into your next throw.

Stretching

Most athletes seem to not like stretching or feel that they do not have 'enough time'. With this in mind the stretches that are outlined in this stretching guide are the stretches that will again give you the 'biggest bang for your buck'. They target the tight/ strong areas that are typical in paddlers as is outlined in Figure 4. You will notice that the majority of the stretches target the hip area. This is because the hip area is very restricted in the boat and can cause severe postural imbalances which effect the mobility of the whole body.

These stretches should be performed as is outlined in the example training plans. It is also beneficial to perform these stretches following your on-water training sessions and throughout the day if you have spare time to help correct your imbalances. Aim to hold each stretch for 1 - 2 min each and actively focus on feeling the stretch in the target muscle group.





Bring your training plans into the real world with printable templates and tracking sheets that allow you to track your training progress.

Appendix 2: Predicted 1 RM

To determine your predictive 1 RM use the form below to record your best weight and reps performed for each of our exercises. This will help you determine how much weight to lift in the different training phases. For details of the testing process see the 'How to test' section.

Table 1: *Predictive 1RM table*

Date	Exercise	Max Weight lifted (Kg)	Max # of reps performed	Correction factor (CR)	Predicted 1 RM (Kg\CR)

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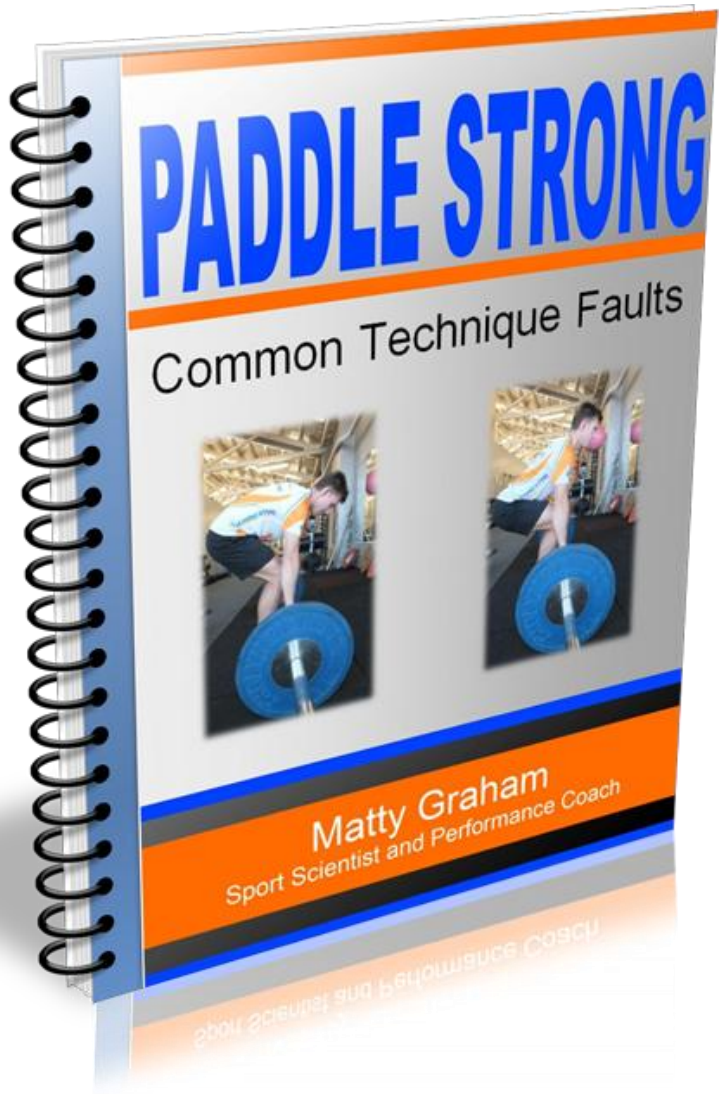

This report tackles the most common technique faults in the gym and teaches you how to correct them to make your time in the gym safer and more effective.

Common Technique Faults

Good technique is critically important to gain maximal benefit from your strength training and avoid injury. Below are some of the most common faults that are found in the gym and a comparison of the correct position. Use these points in combination with the points outlined in the exercise library to refine and maximise your technique.

Dead lifts

Common Faults:

- Rounding of the upper and/or lower back. This is extremely dangerous for your spine while lifting anything.
- Toes pointed out. This creates an unstable ankle and will cause your knees to cave inwards.
- Feet too far away from the bar. Your feet should be under the bar with your shins nearly touching it.

'Fault'

'Correct'

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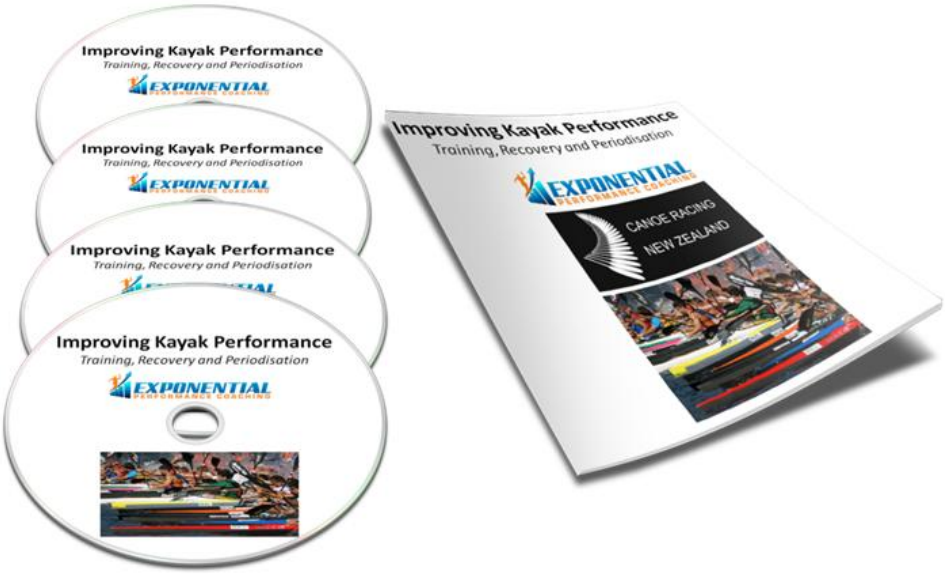

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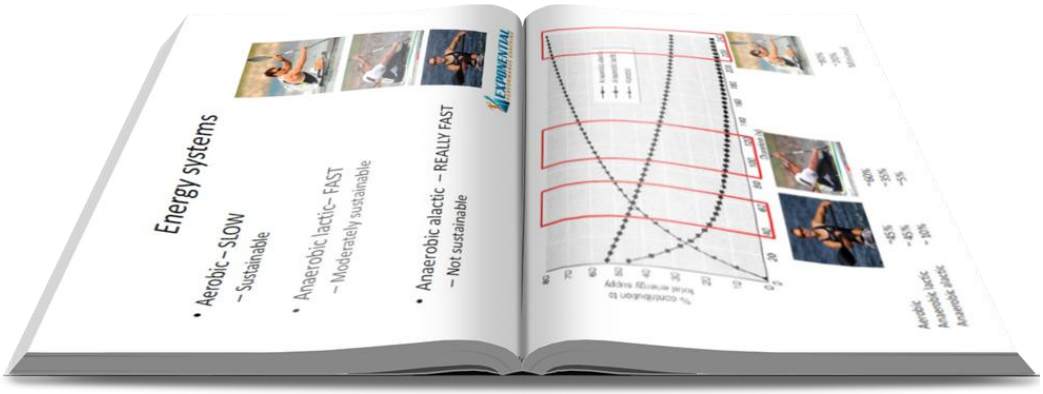

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- **Video 1: How to get the most out of Paddle Strong**
  - In this video presentation you will learn how to get the most out of the Paddle Strong training system depending on your experience and training history. Understanding where to put your focus will allow you to personalise your training approach and boost your performance.
- **Video 2: How to integrate Paddle Strong into your training**
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