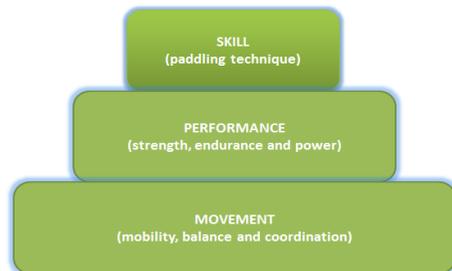


## The performance pyramid

The performance pyramid model designed by Gray Cook (<http://graycook.com/>) can be used for paddlers too. The performance pyramid has three tiers and the lower tiers are the foundation for the tiers above. Applying this model can serve as a guide to determine how well you move and what areas of paddling performance need more attention.

Our goal is a well-balanced paddler with a strong foundation. Tier 1 is the foundation and represents the paddler's ability to move well and without limitations. Moving well encompasses our fundamental movement patterns: including being well balanced, having static and dynamic stability, showing full range of motion, good movement control and body awareness, and good posture. Tier 2 represents performance: the ability to sustain quality of movement and resist fatigue. Tier 2 can be defined also with measurable movement factors as strength, power and endurance. Tier 3 represents skill: how well you paddle technically and how well can you perform.

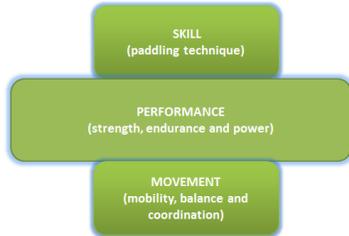
### The "Ideal" Paddler – Balanced pyramid



An ideal paddler's movement patterns, movement efficiency, energy resources and sports skills are balanced and optimal. This paddler can of course still improve - but any improvement should not upset the balance of the performance pyramid. This athlete possesses the ability to explore full range of movement, demonstrates body control and movement awareness in numerous positions or conditions. By having a broad base at the bottom, such paddler builds potential for strength and power output and reduces the risk of injuries. Since the second tier is supported by a strong base, it is able to support the third tier which enables the paddler to transfer the power and strength to his paddling.

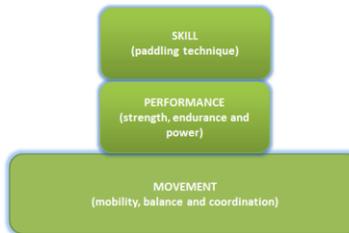
# TiP technical resources

## The “Over-powered” Athlete



The second pyramid shows how the paddler's ability to generate power and strength exceeds his ability to move freely. Most of paddlers fall into this category focusing predominantly on strength and neglecting fundamental types of training such as dynamic flexibility and stability training. Their ability to move freely in simple and basic positions (as well as feeling comfortable in positions needed for optimal technique – think the 'catch frame' position) is limited by poor flexibility and stability in some movement patterns. The focus for these athletes should be to improve movement competency while maintaining their current level of power. Without addressing the issue of having an unstable foundation they won't be able to express their strength, power or endurance. In addition, due to the lack of fundamentals they will start falling short in fully optimizing their paddling technique and thus limit their racing performance.

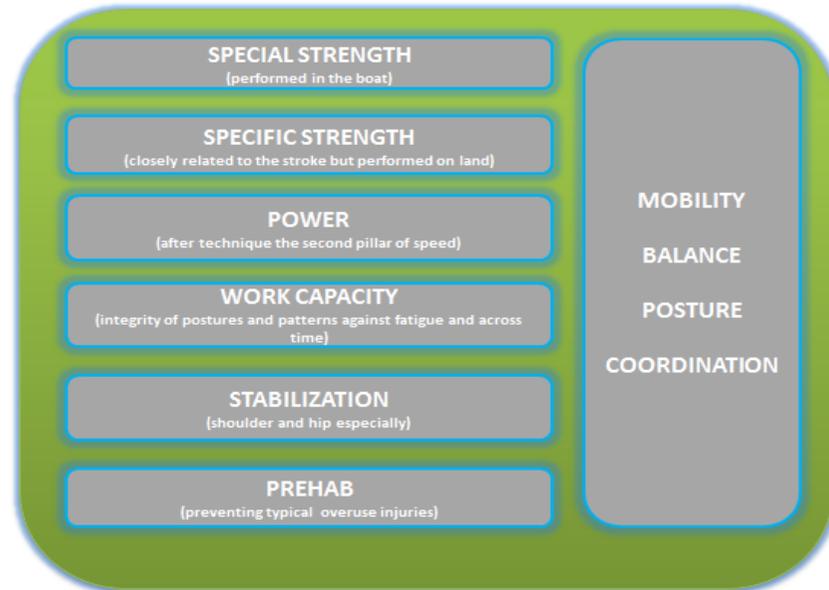
## The “Under-Powered” Athlete



The third pyramid represents paddlers who possess excellent freedom of movement, balance, coordination and even the technical skills but whose performance efficiency is poor (they lack the power, strength and/or endurance). In paddlers this type of athlete is not found often, but we can count in this group young and tiny but skilled athletes and some female paddlers who are good movers and technicians but lack training for power or work capacity.

## The TiP Strength Training Square for Paddlers

The Strength Training Square for Paddlers is a model we use at Training in Paradise when we are designing conditioning programs for paddlers. It simply helps you identify the 7 areas on which to focus in conditioning. The fundamentals are always mobility, balance, posture and coordination – these fundamental abilities enable you to move well and thus form the base of any conditioning program. We should never let our athletes neglect this part of training and if we want to devote more time to other areas we shall increase also the efforts to keep the body able to move well and freely.



**Mobility** – enables you to move freely and especially execute easily all the specific paddling movements in an effortless and efficient way (hip, thoracic and shoulder mobility especially)

**Balance** – a balanced body is the starting point to develop a healthy and resilient athlete (constant work in avoiding asymmetries and negative effects of paddling)

**Posture** – a strong posture in paddling is the base for good energy transfer from the paddle to the boat (alignment and stiffness), good breathing patterns, movement efficiency and injury prevention

**Coordination** – influences the speed of motor learning, technique optimization, technique adaptability (to internal and external factors)

**Prehab** – in a sport where the movement is cyclic we have to devote some attention to prevent typical overuse injuries and make the body resilient to the demands of training (anti-fragile)

**Stabilization** – joint stabilization serves as injury prevention, builds positive stiffness and serves as support to posture

**Work Capacity** – defined by Gray Cook as "**integrity of postures and patterns against fatigue across time**", we need to make the athletes **'fit' enough so they can keep the integrity of technique and postures unchanged during fatigue (training and racing) and in time (endurance)**.

**Power** – the paddler must be able to produce the necessary amount of power for propulsion, this power does not need to be extreme but has to be produced using the correct movement patterns and timing to be useful in the boat

**Specific strength** – is related to the particular demands of the event and the exercises must be *specific* to the type of *strength* required, these are performed out of the boat

**Special strength** – are exercises for strength performed in the boat and thus closely related to technique efficiency and racing performance, among all the groups of exercises these have the largest transfer into performance.

For examples see the Strength Training Exercise Types table below!

The Strength Training Exercise Types table is a tool we use at Training in Paradise to categorise exercises. It makes the job of the coaches and athletes much easier as it helps them understand better what is the goal of a specific discipline in the program and how should it be performed.

Types of Exercises and Means of Conditioning for Paddlers										
Movement control		Prevention	Muscle Endurance/ Muscle Hypertrophy		Max strength / Explosive strength			Specific strength		
Fundamental movement skills	Joint stabilization exercises	Assistance exercises	Work Capacity <sup>1</sup>	General exercises	Core strength	Maximal strength	Power	Semi-specific strength	Specific strength	Special strength (on the water)
Fundamental moves										
Posture										
Mobility										
The goal is <u>quality of the movement</u> – motor control, posture, full ROM, rhythm, breathing patterns, and only lastly force				The main goal is appropriate force production – force(power), motor control and posture				Appropriate force in the correct movement patterns		
<p><b>Fundamental movement skills:</b></p> <ul style="list-style-type: none"> <li>climbing</li> <li>jumping</li> <li>landing</li> <li>holding</li> <li>carrying</li> <li>pushing/pulling</li> <li>hanging</li> <li>gripping</li> </ul> <p><b>Fundamental moves:</b></p> <ul style="list-style-type: none"> <li>squat</li> <li>lounge</li> <li>pulls (horizontal, vertical variations)</li> <li>push (horizontal, vertical variations)</li> <li>rotations (thoracic, low back, hip variations)</li> <li>stances</li> </ul> <p><b>Posture:</b></p> <ul style="list-style-type: none"> <li>postural exercises</li> <li>breathing exercises</li> </ul> <p><b>Mobility:</b></p> <ul style="list-style-type: none"> <li>stretching exercises</li> <li>mobility exercises</li> </ul>	<p><b>Shoulder stabilization exercises</b></p> <p>Mainly the rotator cuff exercises using:</p> <ul style="list-style-type: none"> <li>TRX exercises</li> <li>Rubber band exercises</li> <li>Body weight moves</li> </ul> <p><b>Core stabilization exercises:</b></p> <ul style="list-style-type: none"> <li>resisting transverse plane bending</li> <li>resisting frontal plane bending</li> <li>resisting sagittal plane bending</li> <li>resisting rotation</li> <li>combination of the above 4</li> </ul> <p><b>Trying to connect stabilization exercises with:</b></p> <ul style="list-style-type: none"> <li>strength exercises</li> <li>balance exercises</li> <li>breathing exercises</li> <li>mobility exercises</li> </ul>	<p><b>Preventive exercises:</b></p> <ul style="list-style-type: none"> <li>individual needs (athlete specific)</li> <li>compensatory exercises (keeping the body balanced – lower and upper limbs, left and right side, posterior and anterior chain, posture etc.)</li> <li>preventing typical discipline injuries (sprint, slalom, SUP, rowing specific)</li> </ul>	<p><b>A selection of exercises from categories:</b></p> <ul style="list-style-type: none"> <li>Fundamental movement skills</li> <li>Fundamental moves</li> <li>General strength</li> <li>Core strength</li> <li>Maximal strength</li> <li>Power</li> <li>Semi-specific strength</li> <li>Specific strength</li> <li>Isoinertial exercises</li> </ul>	<p><b>General strength exercises examples:</b></p> <ul style="list-style-type: none"> <li>Bench Press</li> <li>Bench Pull</li> <li>Dead lift</li> <li>Squat</li> <li>Lat pull down</li> <li>Military press</li> <li>Bent over row</li> <li>Upright row</li> <li>Seated cable row</li> <li>Chin up variations</li> <li>Olympic complexes</li> <li>KB exercises</li> <li>Calisthenics</li> </ul>	<p><b>Core strength exercises examples:</b></p> <ul style="list-style-type: none"> <li>Rollout</li> <li>'Windshield wipers'</li> <li>Hang leg rises</li> <li>Weighted curls</li> <li>Olympic lifts</li> <li>Weighted back lifts</li> <li>Hip hinges</li> <li>Calisthenics</li> </ul>	<p><b>Max strength exercises examples:</b></p> <ul style="list-style-type: none"> <li>Dead lift</li> <li>Bench Press</li> <li>Bench pull</li> <li>Military press</li> <li>Squat</li> <li>Olympic lifts</li> <li>Weighted chin</li> </ul>	<p><b>Power exercises examples:</b></p> <ul style="list-style-type: none"> <li>Bench Press</li> <li>Bench Pull</li> <li>Squat</li> <li>Olympic lifts</li> <li>Throws</li> <li>Pliometry</li> </ul>	<p><b>Semi-specific strength exercises examples:</b></p> <ul style="list-style-type: none"> <li>One arm cable row</li> <li>Bench Pull</li> <li>Chin ups</li> <li>One arm Dumbbell row</li> </ul>	<p><b>Specific strength development examples:</b></p> <ul style="list-style-type: none"> <li>Single Arm Machine<sup>23</sup> <ul style="list-style-type: none"> <li>stroke</li> <li>drills</li> <li>static strength at the 4 stroke phase points</li> </ul> </li> <li>Ergometer<sup>4</sup> - fixed and sliding one:                             <ul style="list-style-type: none"> <li>one sided strokes</li> <li>drills</li> <li>continuous paddling</li> <li>sprints</li> </ul> </li> <li>Isoinertial Kayak setup                             <ul style="list-style-type: none"> <li>one sided strokes</li> <li>drills</li> </ul> </li> </ul>	<p><b>Special strength (on the water):</b></p> <ul style="list-style-type: none"> <li>hydro brake</li> <li>strength endurance</li> <li>power</li> <li>weight in the boat</li> <li>starts, speed ups</li> <li>low SR – max DPS</li> <li>specific situations                             <ul style="list-style-type: none"> <li>shallow water</li> <li>front wind</li> <li>different equipment</li> </ul> </li> <li>paddling into shore</li> <li>maximized DPS at certain SR</li> <li>one sided power strokes</li> </ul>
<p><b>ISOINERTIAL TRAINING</b></p> <ul style="list-style-type: none"> <li>Specific strength exercises (posture, movement pattern, joint stabilization, body inertia balancing, force production)</li> <li>General exercises (stabilization, posture, fundamental movement patterns, play with body inertia, concentric and eccentric load)</li> </ul>										

<sup>1</sup> Work capacity is well described in this blog by Gray Cook: <http://graycook.com/?p=2214>

<sup>2</sup> By Single arm machine we mean such a setup or simpler: <http://www.kayakpro.com/catchforce/img/kayak-more-1.jpg>

<sup>3</sup> A collection of exercises and methods to be used on the Single Arm Machine by coach Alexander Nikonov: [https://www.youtube.com/watch?v=Xk\\_wt3vkn1o](https://www.youtube.com/watch?v=Xk_wt3vkn1o)

<sup>4</sup> A simple guide to ergometer training: <https://www.youtube.com/watch?v=BQVnigujR-o>

# TiP technical resources

**Notes about the table:**

- From left to right the complexity of the movements increases. On the far left the exercises are the most basic and fundamental ones. Totally on the right the specific exercises turn into special strength exercises – the only ones executed in the boat.
- As the athlete evolves the emphasis from the left side exercises turns more and more to the exercises on the right side (the higher the level the more specific work an athlete needs).
- But anywhere in their career athletes need to take care of the whole span of the exercises (abilities). Even evolved athletes must take care of their posture, mobility and prevention exercises. In turn also intermediate athletes need to use some of the specific and special strength exercises to make sure the transfer from land conditioning to improved performance on water does happen.