The Kayaking Technique - definition

1) Paddling technique definition

Paddling technique is the method you use to organize your movements for better paddling. It combines various skills and abilities into an efficient and safe way of propelling the boat. There is an optimal technique a paddler should use in a particular situation – that technique depends on boat speed, external conditions, fatigue, part of the race, boat type, fitness level etc. So there is no general technique one can learn. Therefore, the goal of training and teaching technique is to develop a highly skilled and adaptable athlete who is able to adjust his/her technique and maximize efficiency in any situation. Good paddling technique also allows the athlete to stay injury free despite the demands of training and racing.

In order to teach the proper technique for a particular situation, it is important for the coach to understand the basic physical phenomena that influence efficient paddling. For the paddler, it is important to develop the ability to use different technical solutions and to distinguish between more and less efficient ones (ultimately being able to intuitively choose the best technical option in a given situation).

Top athletes are the best examples of advanced and effective technique. They all look different when paddling. But also they have a lot in common. What makes them different is their personal interpretation of the basic technique. It is their personal style they develop to adjust the basic technique to their individual characteristics. What the best paddlers all have in common is that they are all great at exploiting and not fighting the physical phenomena present in boat hydrodynamics and body mechanics.

Example: If you observe Tom Liebsher in the2017 World Championships finals you will notice:

- He uses similar strokes per distance advancement (approx. 40 strokes/100m) both on the start and on the finish of the K1 1000m final. But the technique he uses in the first 80 meters is much different from the technique he uses in the last 150 meters –we can assume from the result achieved he has chosen a very effective way both to start and to finish the race.
- During the middle part of the same race he adopts a different stroke per distance value (approx. 36 strokes/100m) and uses again a different kind of technique to stay in contact with the race leaders while spending as little energy as possible.
- Many of the less visible parameters of his paddling technique again change when he is part of the K4 500m winning crew.

Understanding what is paddling technique, how complex it is and how strongly it affects racing results is very important for the coach and the athlete. When you look very deep into what is the essence of paddling and what is the core around which to build a training system, you see it is technique. So the rules of technique influence how you will train because inevitably wrong technique will limit the expression of all your abilities and capacities.

2) Efficiency and Effectiveness – the end goals of paddling technique

Efficiency

An action is efficient if carried out with minimal waste. Efficiency is calculated by looking at the relationship between applied and necessary power. Efficiency is the decisive element in the long-distance races (A.Pace, 2017).

Example: Hank McGregor's technique at the K1 Marathon Worlds.

Effectiveness

An action is effective when the interaction of various components increases the possibility of achieving the goal despite not being the most efficient itself. Effectiveness is decisive in shorter races, where a significant waste of energy can be justified if the racing time can be reduced even by a small margin (A.Pace, 2017).

Example: Liam Heath in the K1 200m Olympic final 2016

Understanding and differentiating between efficiency and effectiveness is important for the coach in order to develop the 'coaching eye'. Daily coaches are put into situations where they have to decide what technical solutions are acceptable and which ones are not.

3) Factors influencing technique

External factors

- Weather conditions (wind, waves, water and air temperature)
- Race distance
- Boat class (single or crew boat)
- Equipment (boat and paddle model and size, fittings)

Internal factors

- Motor abilities
- Motor capacities
- Direct race preparation (warm up, proprioceptive exercises, activation/relaxation procedures etc.)
- Form
- Experience and technical knowledge
- Psychological characteristics
- Injuries, asymmetries, imbalances
- Anthropometry
- Age, gender

Knowing and understanding factors influencing technique execution is important for coaches in order to better understand individual athletes and the reasons they paddle the way they do.

4) Levels of paddling technique

Basic Technique

Basic technique is the technique we teach to beginners during their early stages of a paddling career. Usually, with basic technique, we divide the stroke cycle into four phases (set-up, catch, pull and exit) to simplify the process. Within the basic technique we teach:

- Position in the boat, workspace, the four stroke phases
- Basic legwork, basic rotation
- Breathing, posture and rhythm
- Balance and basic coordination of movements in the boat
- Basics of boat glide and paddle grip in the water

The basic technique is not enough for top performance as it is a very simplified version of what we see champions use. It is crucial the basic technique is taught well so as to offer a good base for the paddlers to build on in the next phases of their careers. The most talented athletes will build on basic technique alone and achieve a technique level high enough for high performance intuitively. Less skilled athletes will need a coach to teach them the meta-technique and the micro-technique to achieve top performance.

Meta-technique

The term meta-technique defines what are the main hydrodynamic and mechanic phenomena without which a high level of technique execution is not possible. We can divide these phenomena into three groups:

- Boat movements and run (the way the boat moves)
- Interaction with the water (paddle)
- Force transmission (body)

While observing top performances of elite sprint kayakers, we notice these athletes are always exploiting and never fighting against these phenomena. They all respect the notions of meta-technique.

We can not measure these phenomena in itself. But we can measure the physical traces of such phenomena – the paddle slip in the water, the oscillation of the boat in all directions, the angular speed of the paddle etc. There is 9 basic parameters we measure at TiP in order to quantify an athlete's meta-technique. We will explain these parameters in the next blogs. If you want to learn even more, you can read chapter 5 of the book Complements of the Base Technique in Sprint Kayak - Methods of Evaluation by Andrea Pace (download here).

> Example: paddle slip is the movement of the blade in the water during the pull phase and represents one of the 9 parameters of meta-technique. If we limit ourselves only to measuring the movement the paddle might do forward or backward from the point of entry into the water, we can observe:
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> - Champions during top performances have paddle slip 0 (meaning the paddle leaves the water exactly in the point it entered – measuring from a side view)
> - Average paddlers might have a small paddle slip (0-4cm) or a huge one (up to 50cm).

- Sometimes we can observe a negative paddle slip meaning the paddle moves forward in the water during the pull phase. It is rare but some paddlers do it. It is not efficient but still less harmful than the slip backward.

Micro-technique

Is the highly-individualized technique every athlete adopts in order to achieve the best possible outcome. Micro-technique solutions of top performers all respect the meta-technique notions. Micro-technique is about muscular interactions and the achievement of a harmonic and equal distribution of energy. To learn more again refer to the book by Andrea Pace: Complements of the Base Technique in Sprint Kayak - Methods of Evaluation by Andrea Pace, especially chapter 8 (download here).

Example: Compare the techniques of Josefa Idem, Natasa Janics and Danuta Kozak in the K1 500m Olympic finals from 2000 to 2016. All respecting the basic and meta-technique but developing a very own micro-technique.

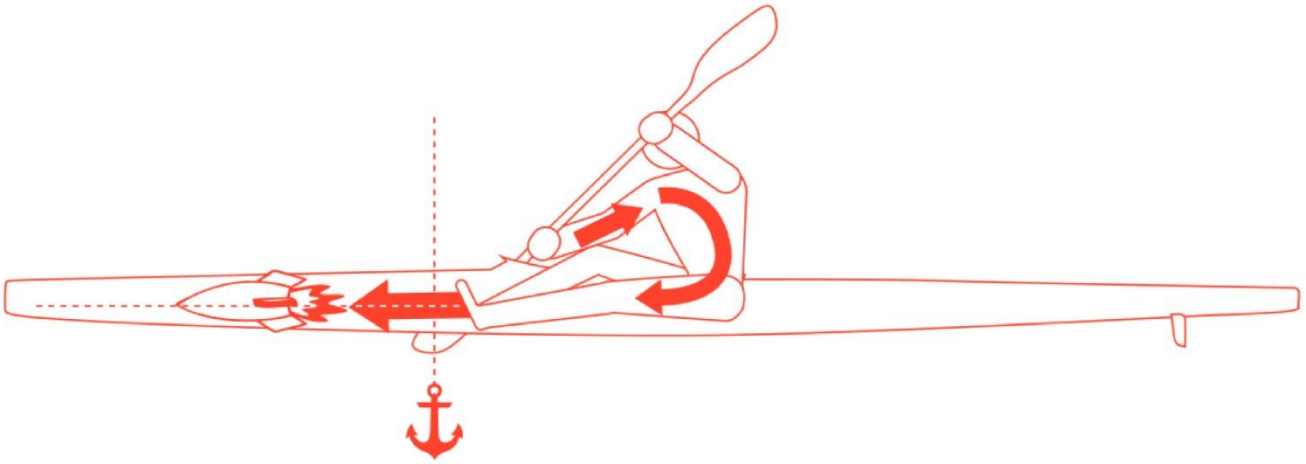

Figure 1: The blade serving as an anchor and the foot thrusting the boat forward.