

Frostbite Camp 2019

From Eli:

Here are the 6 ‘modules’ we talked about, which are a set of 4 technique modules and then 2 extra sessions. Each day has 3 on-water sessions, and these are the 6 on water topics.

The topics taught in each module would be different for different levels of paddlers. When you have time, if you could add key teaching points on each that will be helpful. The idea is to work toward some uniformity in terms of what is taught in each session. On Friday evening before camp, we’ll have a session with the coaches to talk about each ‘module’ and what the coaches should cover. Each coach will need to adapt to the level of their group. More experienced coaches will be with the more advanced groups.

Frostbite Technique Curriculum, Part 1 – General Thoughts on Technique by Dan Henderson

Overall

This outline describes kayak and canoe technique and possible steps in which it can be learned.

Understanding Technique

Over the past 20 year there’s been a huge evolution in understanding technique. Prior to that, there were many techniques, often associated with a country. With the advent and evolution of biomechanics, largely driven by technological advances in imaging and tracking joint centers and bone segments, technique has evolved into more of a standard, consistent model of technique. This is what’s presented in the ICF Coach Education Program that the ACA has adopted. That’s what I’ll talk about here.

Stability

The first step is to learn stability. That is stability without bracing or dragging (deceleration) the paddle anywhere in the stroke most of the time. I prefer to not teach beginners bracing at all because that must just be unlearned later on. It takes longer for beginners to learn stability relying solely with their torso and leg control, but in the long run they have better stability and are able to learn technique more quickly. And they don’t have to unlearn bracing. However, that approach is not universally accepted in the USA. But it is the most common throughout the world.

Each technical improvement, at any level and degree of development, involves the paddler destabilizing themselves to apply more of their body mass onto the paddle. So each technical improvement must be destabilizing. Just like paddlers learn stability at whatever level they’re at, they can learn to get used to the additional instability and make it work for them in each of the technical improvements.

Power

Each technical improvement increases power generation, so it should place greater demands on muscle strength and energy metabolism. So it should be harder – on muscle activation and energy metabolism, including respiration. We’re not trying to make anything easier – every step in athlete development is designed to increase power and speed. Each step is designed to make greater physical and mental demands available to the developing athlete.

Sequencing Lessons

The steps outlined in Parts 2 and 3 are pretty sequential in that each prepares the beginner to attempt the next with a high degree of success.

They are also incremental, with more and more of each technique element incorporated into the beginner's stroke over time, becoming more and more integrated and coordinated.

Each new technical element should be additive. The beginner must hold onto what was learned in previous steps. If s/he is unable to do so, then the previous step was not learned well enough to progress and a step back to continue to work on the previous step is in order.

Each step need not be learned completely. It's best to get it well started and then move on once the beginner is able. Then routinely return to previous steps for further development.

Torque

All human movement is a torque – we are jointed creatures.

Through trial, error, feedback, and success we combine angular movement at multiple joints to create linear movement – like paddling.

$\text{torque} = \text{mass} * \text{acceleration} * r$ (moment or moment arm)

$$\tau = m * a * r$$

These are the only ways to increase power and boat speed

mass is the body mass applied to the stroke – related to technique blade position in water, blade size, and especially body weight loading

acceleration is the change in velocity through the stroke – related to technique, muscle activation, skeletal support, and blade size

moment is the distance between the shaft pivot point and center of resistance of the blade in the water – related to top hand height and paddle length

Torque is an instantaneous measurement. Summing the torque measurements yields the power in a given stroke.

Drills/experiments for revealing to paddlers their optimal top hand height include . . .

Ways to help an intermediate athlete change velocity throughout the stroke include . . .

Force Vectors

Every application of force involves a magnitude and direction. Magnitude is the amount of force applied and involves the distance between a starting and ending point. Direction involves a starting point, the direction in which the force is applied, toward the ending point – where the ending point is relative to the starting point.

Vectors apply to all joint movements.

Coaches can “see” vectors at each joint and determine if that movement contributes to moving the boat forward. Look at the starting and ending points of a single joint. How does it contribute to moving the boat forward? If there's a better movement for that joint to move the boat forward, understand what that is and how to help the paddler learn.

Examples of vectors coaches should particularly watch for in beginning, intermediate, and advanced paddlers are . . .

Force Transfer

When paddlers activate muscle to reduce a joint angle they create a force, which is intended to move the boat forward. That force transfer is facilitated by muscle activation and skeletal (the bones) structure. The more the skeletal structure can be engaged in force transfer, the less muscles need to be relied upon. This is economical because force transferring through the skeletal structure does not require energy metabolism within the bones, while muscles do. Here muscles are only active to hold the bones in position, rather than force going through them.

Much of paddling technique is intended to transfer force through the skeletal (incomplete sentence)

Useful words/metaphors for explaining this to younger/beginning-intermediate paddlers include . . .

Muscle Activation

The amount of force a muscle can exert is a function of its density and cross section.

Muscles with tightly compacted contractile fibers can exert more force than muscles with loosely compacted contractile fibers, or even muscles with greater amount of fat. (Last part of this sentence is unclear to me)

Larger muscles generate more force than smaller muscles. This is the case when comparing a single undeveloped muscle to a highly developed one, and when comparing two different muscles. The larger the muscle cross section, the wider each contractile fiber and the greater number of contractile fibers.

Much of technique development is focused on engaging larger more powerful muscles earlier in the power application phase.

Much of training, especially in the weight room, is intended to increase the cross section of muscles used in paddling.

Catch Paddle Blade Position

At each step, the catch should be right next to the boat, with virtually no gap between the boat and paddle.

For the kayak stroke with a wing paddle, once the blade is locked into the water and body weight is loaded, the blade tends to move away from the side of the kayak.

For this camp can we get consensus on *how wide* the wing should move away, and share some tools for corrections?

For canoe, the blade is pulled right down the side of the canoe.

Blade Angle During Power Application Phase

Generally towards the front of the stroke during the catch phase the paddle is in a positive angle. This allows more effective loading.

During the rest of the stroke keep the paddle in a vertical position as long as possible

As the paddle angle becomes negative it's time to finish that stroke and go onto the next

The Art of Coaching

"Give them what they need, not what they want", Mike Tomlin. Are you coaching to be popular or to facilitate growth. There are times when these are not compatible.

When teaching anything, what offers the greatest entertainment value is figuring out what the athlete is currently capable of and what s/he can absorb next.

Individualized coaching

Once the basics are learned, technique development becomes very individualized as people learn at their own individual rate.

Different people learn various technique elements at different rates and to different degrees. You can't just line them all up day after day and go over the technique improvements as a generic group.

Different people respond to different words in different ways, so finding the right words that connect with each individual for each technique (or anything else) lesson is critical.

While we do a lot of isolation of movements at individual joints or body segments, everything is connected to everything, so it's important that paddlers understand connecting power through joints to other joints to propel the boat.