Assessment: Physical Education

Transcript

Biomechanical problem

This video is available for viewing at www.qsa.qld.edu.au/25849.html

Speaker: Transcript.

Response A: St Stephens

The problem was to identify a specific fault or weakness in my paddling technique, and then tell everyone how it affected speed, accuracy and consistency of my performance.

As you can see, here my fault is shallow forward paddling. The paddle here comes into contact with the water for a very short period of time and this means when I pull my arm backwards it gives me less forward propulsion and takes a longer time for me to produce a sweep stroke for turning around.

Newton’s 2nd law states when a force acts upon a body and changes its velocity and the amount of acceleration produced is directly proportional to the size of the force that caused the change.

Now the factors affecting my kayaking ability are my sweep stroke in that this less acceleration refers straight back to the 2nd law. When I put my paddle into the water and I pull backwards the force going forward is less than what it is going backwards.

This is the diagram of me sitting in the kayak. This is my paddle back here (point to diagram), water pushing this way and my repulsion is forward, my weight is pushing down on the boat and the buoyancy is pushing me back up and then the wind direction. You could cross wind or come backwards.

Newton’s 3rd Law is every action has an equal and opposite reaction. Factors affecting this Law is my paddle stride is too short and shallow. So when I put my stroke paddle into the water it’s only from about half way point of the kayak to just half way point between the hands and me and this causes me not to have enough forward propulsion.

The length of my stroke, as you can see here, this is where it begins and this is where it ends and this is only a short distance. Same diagram here, to where it finishes and where it begins and my stroke only has a limited amount of force because of the length in which the stroke was applied. Now this amount of time or distance here is not going to give me enough forward propulsion, as what you see here as Mark has put his paddle in and this is where it finishes and same where he finishes and begins. Now Mark’s stroke length has a maximum amount of force generated because the time in which his stroke has been placed is greater than what mine is and this gives him the maximum amount of forward propulsion.

Now the comparison of the two, you can see that Marks paddle at the end of it is in the water much more than what mine is. Most of it, about 95% is out where his is probably about 50/50. Now the depth at which Mark’s paddle is significant...

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to mine and this is causes him to have more forward momentum, more motion and this gives me a very limited amount.

The Summation of Forces is referred to by the introduction to mechanic is “for athletes to produce the maximum velocity of a projectile in which in our case is the kayak, and each segment of the movement should be moved at the instant the previous segment begins to slow down”.

Another summation of forces shown by Amezdroz in summation of forces we have the hips and then stern followed by our legs and ankles and trunk and shoulders and followed by our arms and wrists. Now you can see here that the hips produce and they start the quarter of summation and then it goes to the legs which are then produced and then trunk, hips and then the arms and wrists which produce the minimal amount of force and then finish off with a stroke.

Propulsion is “the surface of the paddle provides propulsion”. [here I’ll just grab this] You see here, this paddle here, is the part that comes in contact with the water and then this gives me most of my forward propulsion as I point through the water like that.

As you can see the variation of water pressure creates lift force so when I push this through I have a high velocity here and a low up here when I pull through the water.

Now this type of velocity water creates a region of low pressure causing me to go forward. The movement occurs when the region of low pressure is behind the paddle again forcing me to go forward, and this was shown in the movement by Amezdroz.

Now propulsion in …

You can see here that it’s only for a very short amount of time and there’s not very much forward compulsion going in here and the bulk of the kayak movement is very slow compared to Marks.

Now there are three different types of levers, the first second and third. These are classed according to the relative positions of the force, fulcrum and resistance force. Our body uses mainly third class levers, see here where we have a load which is the resistance force, it’s the water, the effort force which is our arms here and the fulcrum middle point which is our elbow joint.

As you can see here again as I just demonstrated this is the effort force, fulcrum and the resistance force. When we hold our paddle in water, resistance is on the paddle, effort force is on our arms and fulcrum is in our joints. This is another demonstration of a third class lever.

Just in summary my kayaking ability was affected by my shallow stroke, which again won’t get me to where I want to be in the time I want. The summation of force was incorrectly timed so the sequence of muscle contractions didn’t provide an actual amount of force, which as when I had previously kayaked I could certainly tell my muscles aren’t producing the maximum amount of force to get me to the [other] stroke.

The propulsion force was not at its maximum due to the summation of forces. These two directly link together as well with the third class levers, as I brought my arm forward like this my arm bent and it caused me to use most of that energy as I came around.

My lever bent half way through the strokes, as previously mentioned, and this reduces the force to overcome the resistance.

In conclusion we have the improvements which I can make better and then
cause me to have a better kayaking stroke. We begin the stroke at the bow of the boat, so the front, and then as we go forward we pull it right back to the back of the boat and that’s shown by Mark’s stroke. We have to correctly time the sequence of muscle so that legs, hips, shoulders and arms can finish off the stroke and lastly to keep my arm straight and to produce the optimum amount of force in the water.