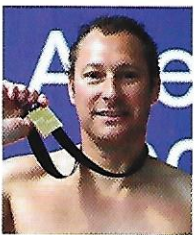




IN PURSUIT OF PERFECTION

BREASTSTROKE TECHNIQUE



Former elite swimmer and Swim England licensed tutor, **Nick Gillingham**, concludes his look at the technicalities of breaststroke.

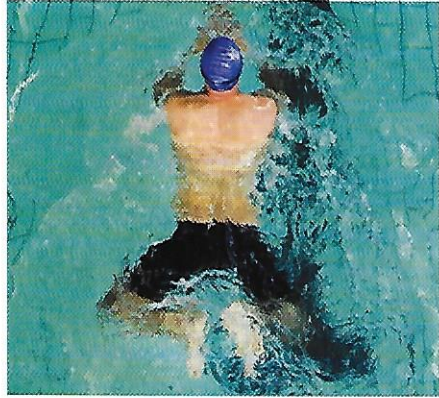
This article focuses on legs, arms and breathing.

LEGS

The leg kick action can be described as having four main phases:

1. **Recovery**, 2. **Catch**, 3. **Down-sweep and Out-sweep**, 4. **In-sweep and Up-sweep**.

In reality, the swimmer is simply recovering the feet towards the hips to turn them out and then drive them back finishing with feet together and toes pointed with full leg length.



1. Recovery

Always move to eliminate the dead spot and reduce frontal resistance. It is highly important to allow yourself to get into the 'propulsive' stages of the stroke without overly increasing resistance. It's an issue that can't be avoided but we must work to minimise and discover the optimum. One good example is pictured here in respect of knee positioning (knees set back from the hips) at the end of the recovery where the feet are almost into the 'catch' position.

During the recovery phase of the feet up towards the hips, we will also be recovering the hands forward into streamline. At this point in the stroke cycle we are not pulling or kicking - in fact we are not swimming at all.

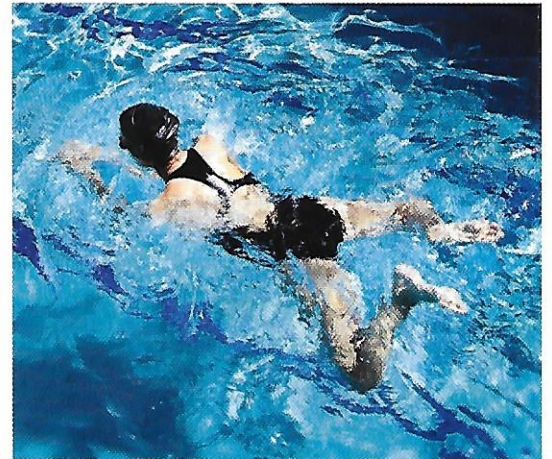
Instead, we are moving forward and it is here that we must work on maintaining speed as much as possible. Allow the hips to constantly flow and move forward by keeping the knees backward of the hips during the recovery of the feet and at the end of the recovery.

2. Catch

The catch phase, where the feet turn out, takes place at the end of the forward recovery phase of the hands. The 'catch' is close to, but set back from, the hips. The feet will be turned out in what is called a dorsi-flex position. This is not easily achieved. To optimise the catch, sweep the ankle tip towards the tip of the hip allowing the feet to separate to hip width apart having the heels aligned with the hip and ankles almost completely facing forward. Draw the toes up towards the shin as this will help turn the soles of the feet outward to fix against the water.

3. Down-sweep and Out-sweep

Prior to this phase, focus on fast hand speed into a piercing streamline position at the front of the stroke. This will help optimise the effect of the kick action as the feet drive down, out and back after the catch where the feet are fully turned out. This is the most powerful phase of the kick through great use of the upper leg muscles and offers great propulsion. Physics shows that up to 80 per cent propulsion is achieved from the legs at this stage of the kick. Elite female swimmers can achieve a generated force of 100lbs in each kick.



4. In-sweep and Up-sweep

As the kick drives you forward, swimmers experience wave drag resistance from the turbulent water around them. To help overcome this, make a real effort to maintain the body in a horizontal position finishing with the feet in-line with the hips and back into a streamline position. To help achieve this position, drive the power from inside the upper legs and all the associated muscles groups, finishing the kick with fast feet using the muscles down the shin bone and through the feet, finishing the stroke in 'streamline'. ■

ARMS

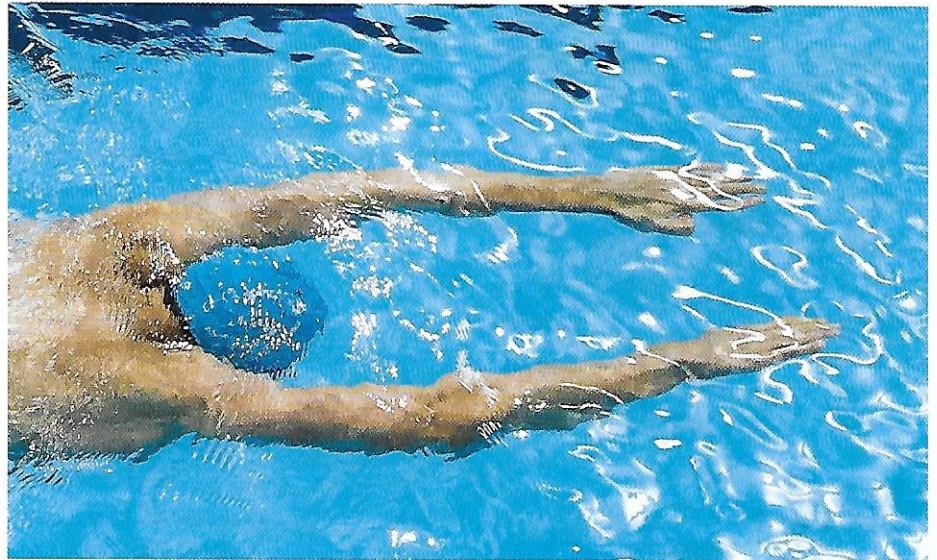
The pull action can be described as a rapid sculling motion and yet has four main phases:

1. **Out-sweep**, 2. **Catch down-sweep**,
3. **In-sweep and Up-sweep**, 4. **Recovery**.

In reality, the swimmer is simply pressing out with the palms and pressing in with the palms through an oval pattern in front of the shoulders.

1. Out-sweep

I believe this should be referred to as the first catch phase but is often overlooked with swimmers slipping water due to a poor initial fix during the immediate onset of the pull due to the angle of the palms. Make a real effort to generate force as quickly as possible during the pull. Science has shown that most swimmers of a national standard begin to generate force at 0.5 seconds into their stroke. Elite breaststroke swimmers can generate 40 per cent of force in the first 0.2 seconds. During the Out-sweep of the pull, swimmers must keep the head fixed in a neutral position with downward vision (straight neckline) as they press out to twice shoulder width.



2. Catch

At the widest part of the pull, the Catch phase takes place where the hands press downward while maintaining a high elbow position. Swimmers must change the angle of attack against the water and ensure high pressure against the water through the hands, wrists and forearms. A common fault is staying wide during the Catch, so focus on deliberate rotation of the wrist angling towards the naval.

Forces in each hand can vary by up to 20 per cent, an imbalance that can take you off course. Elite swimmer force exertion may vary by only 0.5 per cent. With this focus on straight forward propulsive, elite swimmers can achieve a distance per stroke almost equal to their height even for the shorter breaststroke distances.



3. In-sweep and Up-sweep

Compress the frontal section of the body at the end of the in-sweep and up-sweep to pierce through the water like a torpedo. At the end of the in-sweep and upsweep, where the thumbs cut through the water surface, the force generated takes the stroke to its peak velocity. Force readings in excess of 100

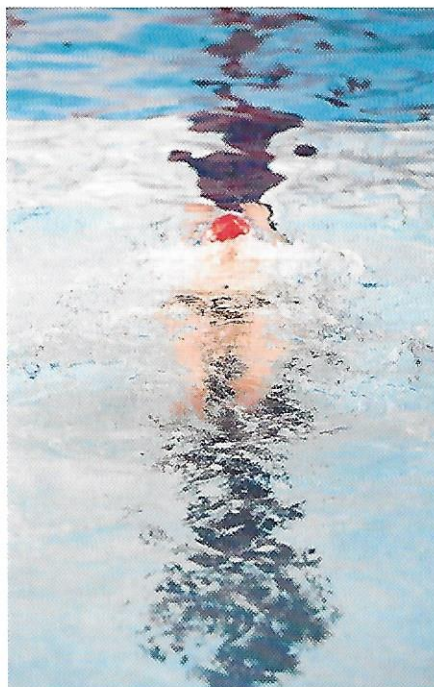
newtons have been recorded, which is more than 10KG (22lbs) of force, so focus on real power during this phase of the pull.

Allow for optimum rise of the stroke due to the resultant force created by the in-sweep and up-sweep of the hands. The high pressure across the palms and forearms (with a strong

wrist connection) will cause lift as there will be low pressure across the backs of the hands and forearms. At the end of this powerful phase, drive the elbows inward to fully engage the chest (pectoral muscles) keeping the palms facing each other.

4. Recovery

Keep the hands up at the water surface while reaching forward and stretching into streamline at the front of the stroke. As the hands shoot forward, rotate the wrists quickly as this will help keep the hands up due to high pressure from the water under the palms of the hands. Arms will be fully straight at the end of the recovery prior to kicking back with the palms facing slightly outward and downward at a slight 'V' angle. This will ensure there is immediate high pressure as the pull commences during the out-sweep phase once again. In the fully stretched streamline position, the feet and toes will be pointed as an extension to the lower leg. When streamlining, hands will be close together with thumbs touching. The head will be between the arms with face and vision toward the bottom of the pool with a closed chin position and straight neckline. ■



Common Faults

- Swimmers should avoid looking forward at the start of the pull as this has a negative effect on the body position where the hips are lowered with a saucer shape effect or, quite often, the hips, legs, feet are lowered at an angle which increases drag known as frontal resistance.
- Avoid pulling too far back following the Catch phase as this has a negative effect on the flow of the stroke and increases resistance. It also makes for a difficult recovery of the hands, with hands often slowing down or stopping at the chest or under the chin before forward recovery.



BREATHING

☞ Breaststroke is swum with explosive breathing (maximum breathing) during the intake of breath and maximum exhalation. This type of breathing is called diaphragmatic breathing, or tummy breathing.

When breathing, the head will be fixed at 45 degrees and swimmers should see their thumbs cut through the water surface as they drive forward. It's important to breathe strong on every stroke from the very start and not just when tired or short of breath.

As the hands and forearms press and sweep inwards and upwards to the water surface, the body will rise naturally to breathe. Allowing the hands to press and sweep upwards at this point will give natural lift of the head and shoulders allowing for the breath to be taken at the highest optimum point without excessive lift from the lower back.

Elbows will be inside the front lines of the

body when breathing. Maximum intake of breath is particularly important for the 200m breaststroke where the obvious difference is a longer leg glide when streamlining, thus resulting in a lower stroke count and less breaths.

Good Practice

- Start the pull once the feet are together at the end of the kick phase with toes pointed. Keep looking down during the out-sweep of the pull. Look down as you are recovering the hands quickly forwards, keep the hands up during forward recovery, look down when kicking back and look down when streamlining. Avoid pulling too narrow or kicking too narrow. Focus on reducing resistance but at the same time allow the stroke to optimise power.
- Always complete the stroke cycle as quickly as possible to get back into

streamline. Avoid moving the hands slowly for longer breaststroke distances. Focus on fast accelerating hands and feet throughout the stroke cycle prior to streamlining. Strive for a smooth constant flow with constant forward movement almost falling forward over the front of the stroke as if you were swimming downhill yet undulating at the water surface.

- Whichever breaststroke event you swim, the pull should only start once the kick action is fully complete. It's not always about how good we are at kicking, pulling or breathing but how we coordinate the components. It's a full stroke, of course, to include pull, breathe, kick and glide. **ST**

To read part one of Nick's article, search for the technicalities of breaststroke at www.swimming.org/sport