

FINE-TUNE YOUR CRAWL PART I

The secret to faster swimming lies in good technique. And that's why Glen Walker's new series of front-crawl drills will be vital reading, whatever your ability.



Glen Walker

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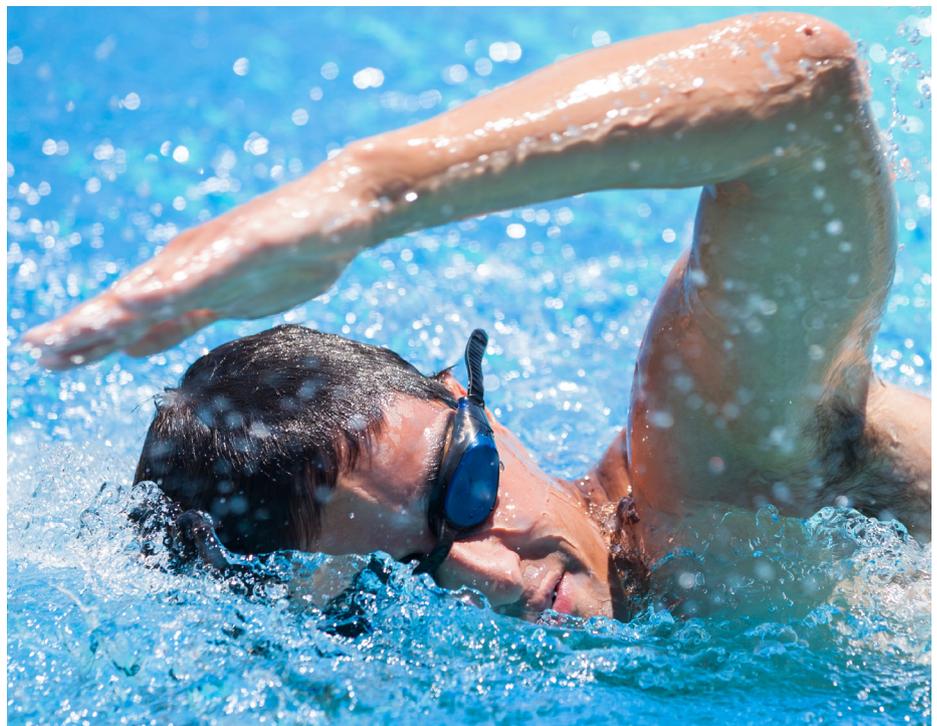
What would you say if I told you every one of you has the physical ability to record a sub 25min swim for 1,500m?

Sadly, while a few will reply they can, the masses are left trailing around the 30-45min mark. But it needn't be so. With a winter spent focusing on correct technique, you can achieve seemingly effortless front crawl.

To reach this pool nirvana, we'll spend the following four issues giving you the (i) drills (ii) practices and (iii) workouts required to improve your relationship with the water. And we'll apply this aquatic trinity each issue to the following five key components:

1. Body position
2. Leg action
3. Arm Action
4. Breathing
5. Timing

In each issue you'll receive progressive drills to work on for each component, so in no time you'll be seamlessly uniting this vital quintet for faster, energy-saving swimming.



Putting it all together

In part one the drills/practices prescribed are stand-alone, meaning you shouldn't try to incorporate them into your existing training sets. They need to be approached slowly, diligently and thoughtfully. These are the building blocks of what we'll cover in parts 2, 3 & 4. If you don't master these exercises, you'll find yourself doing remedial work later, when you should be working on your fitness.

As anti-social as it sounds, I'd recommend you do these drills alone unless you have a 'swim buddy' who's going to follow the same programme.

You should keep the sessions short – at around 30-40mins max – practising little and often, ideally everyday or every other day.

They're quite easy to pick up, so it shouldn't be long before you can complete this month's drills within 10mins. If so, you can spend the remainder of the session swimming lengths but, if you do, make the ¼ catch-up drill (see page 6) the focus of each length.

Body Position

Before we begin it's worth stressing that water is almost 1,000 times denser than air; it's a substance that will slow you down. Our job is to minimise drag by swimming through the smallest hole in the water possible, so first pointer: don't swim with your head up. It just increases the resistance against the water.

Rather, you must keep your head in a neutral position – except, of course, when you're sighting for a buoy in a race, "Neutral?" we hear you ask. Let us explain... As humans we all stand a little lazily. When viewed from the side our chins stick forward a little and our bottoms stick out, creating a slight 'S' shape. This is not good aquatic posture.

So to get neutral, with the aim of getting horizontal in the pool, do the following... Lie on the floor, face up. There'll probably be two gaps between you and the floor – one at your lower back, the other under your neck. Try to eliminate these gaps by pulling your belly button to your backbone (tilts your pelvis) and tucking your chin in until your neck extends and you're looking straight up. Your head and spine are now elongated – you may even be an inch or two taller. This is neutral.

You can even try this in the pool... Lie face down in the water, eyes looking at the bottom of the pool, arms and legs completely relaxed (this is known as 'dead-man's' float). Now slowly bring your arms forward, towards the surface at shoulder width; at the same time, pull your belly button to your backbone and tense your abdominal muscles as you did when lying on the floor earlier. The back end of your body should rise with your hips, coming quite close to the surface.

However, once neutral there are still hurdles to overcome to get horizontal. The problem we have is that our lungs are the main things that keep us afloat – plus a little body fat – but they're not in the centre of our body. As a result our legs hang down. To help combat this you should stiffen your 'core', though while this makes our bodies straighter, we're still not 'balanced' in the water. You can rectify this further by lengthening your upper bodies in the water; instead of pulling your neck into your shoulders, you should extend your neck.

But the icing on the balancing cake is to add more weight to the short end. This is variously known as 'pressing your chest', 'pushing on the buoy', 'lying on your lungs' and 'pressing the T'. This works providing you don't bend at the neck or waist, and is one of the reasons why core strength is so vital for swimmers. To practise this, follow the previous example of the dead man's float but this time press your chest into the water.

You can then progress onto the three balancing drills in the Body position drills box.



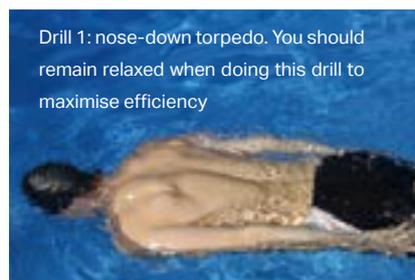
Achieving a near horizontal body position is key to minimising your resistance against the water

Body Position drills

The three drills below all come under the umbrella term 'nose-down torpedo'. They may be done with fins on if you're a poor kicker. Don't expect to go fast during these drills; in fact, you should be able to do them with barely any effort while maintaining good balance and posture in the water.

Drill One: Shooter

1. Lie face down in the water with your arms by your side. Reach your hands down your thighs - this will help round your shoulders slightly and lengthen your neck.
 2. Lean on your chest until you feel your hips or bottom are at the surface. As you press, maintain a consistent gap between chin and chest, like you're holding a large orange.
 3. Focus your eyes on the bottom of the pool; imagine a plumb line hanging from your nose.
 4. Extend your neck/lengthen your spine. The back of your neck should be smooth without ripples in the skin. Get a friend to check.
 5. Lead with the top of your head, not the forehead and not the crown.
 6. Kick from the hips with soft knees and relaxed, floppy feet. Warning: don't point your toes - this will lead to cramp in your foot or calf. Just imagine your feet are flippers; relax your ankles and let the feet/fins do the work.
- Note: start off by doing this drill for as long as you can without breathing.



Drill 1: nose-down torpedo. You should remain relaxed when doing this drill to maximise efficiency

Drill Two: Nose-Down Torpedo (breathing to front)

Once you can travel a fair distance without breathing, try fitting in a breath to the front. Key to this drill is that you don't hold your breath for too long. Also, find a rhythm where you'll breathe once every 6 or 7 seconds. And make sure you exhale before lifting your chin to breathe – there won't be time to breathe out and in above the water. Maintain a constant leg kick.

Drill Three: Front-Mounted Snorkel

Another way of doing it is with a front-mounted snorkel. It's exactly the same drill as 1 and 2 but the snorkel allows you to practise for longer without interrupting your balance. You can buy a good-quality snorkel from all good swim retailers.



Drill 3: front-mounted snorkel. This will help you breathe without disturbing the nose-down drill

Leg Action

The leg kick in triathlon is often the subject of huge debate with most triathletes saying that they prefer to hardly kick at all in order to save their legs for the ride and run. However, the leg kick isn't down to conditioning – it's down to efficiency. That means if you get it right, you really won't use up much energy.

You see, while it's true that the leg kick only generates 10-13% of the propulsion in the very best swimmers, most triathletes have a leg kick that generates negative propulsion. (Are you one of those who go backwards or nowhere when kicking with a float?)

Now don't worry – I'm not going to request an Olympian's six-beat kick (six beats to one stroke). All I ask is that you spend some time practising this, until now, neglected skill, not only for its propulsive reasons but because it affects your ability to maintain a streamlined position. And if you don't believe me, here's why...

If you don't kick, you're not engaging your abdominals – try swimming a length with your knees and feet together without a pull buoy – which are the link between the two halves of your body. As a result, your bottom half will react to what your top half is doing (Isaac's third law – for every action there is an equal and opposite reaction), so every time you overdo the swing for an arm recovery – and there's a tendency to do this when you're restricted by the neoprene of the wetsuit – your hips will shift slightly outside the streamline and create drag.

So while your shoulders are rolling around the axis, your hips are swinging across the axis, and every time they do, it's like dabbing the brakes in your car. You interrupt your momentum and have to use more energy (fuel) to regain speed. The interruption to your rhythm also prevents you from relaxing and flowing through the water.

So what's the best way to kick? Firstly, forget about pointing your toes. If you point your toes then you'll have no mobility in your ankles, and ankle flexibility is integral to a propulsive kick. You need your feet to react/flex with the weight of the water the way a flipper does.

Secondly, the kick is initiated at the hips because the large muscles of your hips have lots of endurance.

Finally, don't bend your knees too much. I can't give you precise angles but try to kick with a long leg and a soft knee. Over-bending the knee means you will engage the quadriceps and hamstrings too much and they are big muscle groups which will demand a lot of oxygen – if you can feel lactic acid building in your quads and hams then you're probably not initiating the kick from the hips.



An efficient leg kick should be powered by the hips and involve minimal knee flex

Leg Action Drills

Before you practise your leg kick, you need to gauge your ankle flexibility, to give you a foundation to work from. You should then perform the vertical kicking drill.

Measuring flexibility

1. Sit on the floor with knees and feet together.
2. Keeping your legs flat, straighten your toes and try to get them as close to the floor as possible (without lifting or bending the knees off the floor).
3. Ask someone to measure the distance from the top of your big toes to the floor. (World class swimmers can get to within 1in of the floor with legs flat.)



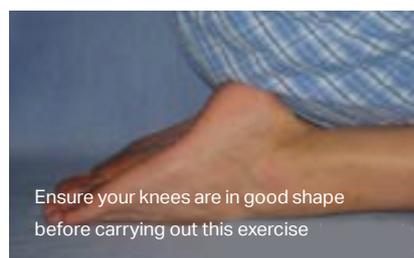
All you need to measure your ankle flexibility is a ruler and legs

Improving flexibility

If you have good knees, then this is a really easy way to stretch you ankles.

1. Kneel on the floor with your knees and feet together.
2. Sit back on your heels so that your insteps are flat to the floor.
3. To increase the stretch, lean backwards (support your weight with your hands if necessary).

Note: Ensure your knees are in good shape before carrying out this exercise.



Ensure your knees are in good shape before carrying out this exercise



Drill One: Vertical kicking. The deep end is the place to practise this

Drill One: Vertical Kicking

A pool that is at least 6in deeper than you are tall is the best place to practise your kick.

1. Float vertically in the water, letting your legs hang from your hips.
2. Your eyes should focus parallel to the surface. (You'll be able to tell if you're doing it right, as lifting your chin will drift you backwards. Correct technique will see you remain in the same spot.)
3. Now swing through the centre line. Think of your legs like pendulums, the centre line being the line from the hips to the toes when the legs are hanging. Your kick should be even in front and behind – about 12in either side is ideal.
4. It should be a nice, compact flutter kick where, with a relaxed ankle/foot, you'll be slightly pigeon toed.
5. The weight of the water should be on the front and soles of your feet.

Arm Action

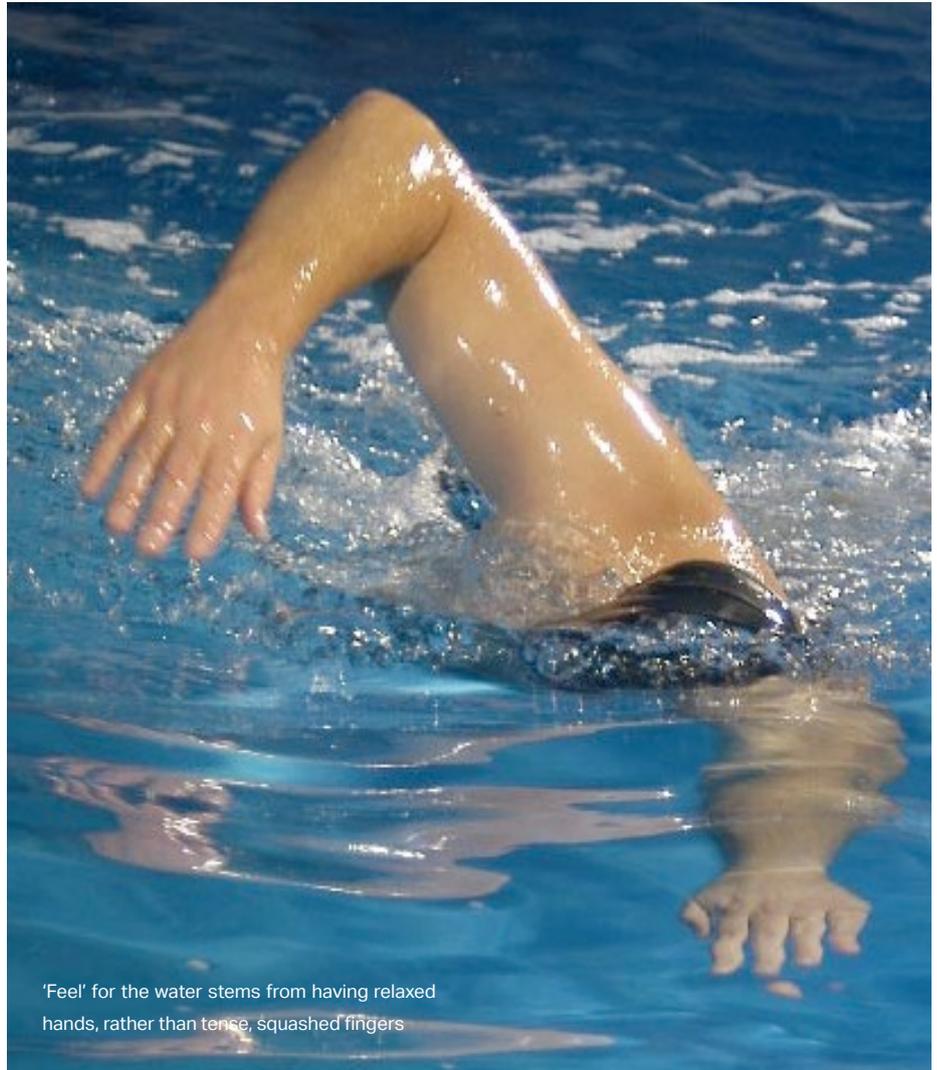
All good swimmers are said to be able to 'feel' the water. Some more mystical swimmers believe that this is a gift bestowed at birth by the gods and cannot be taught. A friend of mine once decided to shave the palms of his hands in an effort to make them softer! He reasoned that if his hands hurt, then he must be 'holding' the water. If they didn't, then he must be slipping the water.

The real trick, however, is to relax your hands; they most definitely shouldn't be regarded as paddles with the fingers and thumb all squashed together and tense. The job of the hands is to hold the water as you propel your body past them – and you can't feel the weight of the water if they are all tense.

You should relax your hands with the fingers just lightly touching and the thumb in the most comfortable position for you. Hold your hand out in front of you with your palm up. In this relaxed position, you'll observe that it's slightly concave and could hold a small amount of water. When this shape meets resistance of the water, it'll naturally expand to take on the shape of the most efficient paddle, but you'll still be relaxed enough to feel the weight of the water.

Arm Action Drill

You can experiment with the hand shapes/positions while a passenger in a car. (Caution: do not try this on busy roads or on trains.) Simply place your hand just outside an open window and feel the shape/position that provides the most resistance. Your hands should always seek the path of most resistance.



'Feel' for the water stems from having relaxed hands, rather than tense, squashed fingers



Your breathing should fit neatly into the timing of your arms and not hinder cadence

Breathing

Good breathing is relaxed and rhythmical; it fits neatly into the timing of the arms and doesn't inhibit your cadence. There should be no obvious sounds of deep inhalation and exhalation. The mouth of the athlete will be relaxed, especially the lips.

Sounds easy, doesn't it? But after balance, poor breathing technique is probably the greatest source of frustration and fatigue for triathletes. If you're one of those triathletes who finds they're completely exhausted after 50m but your heart rate is still quite low, then it's almost certainly a breathing issue, and it's very likely that the cause is a form of hyperventilation as a result of one or two of the following:

1. Holding your breath under water and trying to breathe out, then in, when you turn to breathe. There isn't enough time to do both!
2. Breathing out too much under water and upsetting the O₂ /CO₂ balance.
3. Breathing in and out through pursed lips as if breathing through a straw (which can also make you feel bloated and windy). Results in very shallow breathing that barely reaches the lungs.

Breathing should be easy because there are lots of opportunities to breathe while swimming. For example, if you have a stroke rate of 60 per minute and breathe every other stroke, you'll get a chance to breathe every 2secs or 30 times a minute. At that rate you don't need to breathe too deeply but you do need to keep 'topped up' and maintain the correct O₂/CO₂ balance. Even if you're a bilateral breather, you'll still get 20 chances per minute or once every

3secs. Note: nearly every distance swimmer in the world breathes once every stroke cycle but they will do hypoxic (see Jargon Buster, p6) sets during their training swims. A favourite is 5 x 400m – first 100m breathe every three strokes; second 100m every five strokes; third 100m every seven strokes; fourth 100m every nine strokes. Be warned, however: this can be highly dangerous to the untrained.

To get used to breathing correctly, let the 'rebound' take care of the inhalation. Try this... Sitting upright in a chair, hold a piece of paper in front of your face. Take a breath – not overly deep – before blowing out through pursed lips to make the paper flutter.

Continue to blow firmly until you feel your lungs shrinking and your rib cage contracting. Keep blowing. When you can't blow anymore, hold your breath, put down the paper and hold your nose.

Once you're holding your nose, open your mouth and relax as you sit tall once again in the chair without deliberately inhaling. You should feel your lungs fill automatically. Once they do, you can continue to breathe normally again. This rebound effect relies on a couple of things:

1. You expel a certain amount of air. It doesn't have to be much; it's the same process that keeps you breathing while you're asleep.
2. You let your diaphragm expand. It's why you might find wetsuit breathing difficult.

Once you feel comfortable with that, try it in the pool by following the practices in the Breathing drills box.

Breathing Drills

The two practices below will get you used to aquatic breathing.

Drill 1: underwater rebound

1. Find a spot in the pool where you can hold onto something to prevent you floating up.
2. Go underwater (face vertical) and breathe out through your nose and/or mouth until there's nothing left to give. At this point hold your nose and open your mouth; the water will go in but not down your throat unless you suck it in.
3. Now slowly rise to the surface, keeping your face vertical or chin slightly tucked in. The water will slowly run out until your bottom lip clears the water. Note: some water will be retained in the 'bowl' behind your teeth.
4. Once the water has cleared from the back of your throat, you'll be able to relax and let the 'rebound' effect take place. Note: don't try to breathe too soon after coming to the surface; do start with short periods of time underwater and lengthen as you become more confident. Once you feel happy with the rebound, move on to 'bobbing'.

Bobbing

1. Find a quiet corner of the pool in the shallow end, facing the pace clock if possible.
2. Stand with feet apart and arms wide at the surface for balance.
3. Bend your knees and drop just below the surface while blowing out through your nose and mouth. Keep your mouth open and relaxed, allowing the water to run out as you return to the surface.
4. Allow the rebound to take effect but assist by breathing with a relaxed, open mouth – feel your diaphragm expand as you do.
5. Practise slowly at first, then gradually increase the tempo until you can do 30 'bobs' in 60secs without feeling out of breath.

Note: you can use this breathing technique as required before setting off for each length. Initially it will take 15 or 20 bobs to find the pattern but, as you get more comfortable, all you'll need is a few bobs.



Timing

There are timing nuances at work throughout every aspect of the stroke but here we're going to focus on the timing of the arms. This will help utilise the rotation of the body around the axis, which will benefit your swim in four key ways:

1. Form drag is reduced.
2. A more relaxed recovery.
3. Achieve a body position that allows you to use your core strength to aid propulsion.
4. Allows you to engage the biggest muscles of the upper body (for example, latissimus dorsi or lats) so that you can increase distance per stroke (DPS).

The arm-rotation interplay is integral because freestyle is a 'long axis stroke', the axis being through the centre of your body just in front of your spine. If we were to swim flat and without rotation, we become barge-like.

In addition, the recovery is compromised, causing the arms to sweep around the sides, setting up a reaction at the hips known as lateral deviation or snake hips. This leads to further increases in form drag because the hips swing across the axis and outside of the streamline. Also, this flat position doesn't allow you to use power stored in your core. (Try throwing a cricket ball while standing with your feet and knees together!) And it limits you to swimming with the smaller muscles groups of the arms and shoulders.

By now, hopefully you're convinced that you need to develop a rhythm and timing to your arms that allows you to achieve points one to four. To do this you need to eliminate the tendency for a rotational stroke where the arms are opposite; in other words, when one is at the front, the other is just exiting the water and they are in time like a windmill.

What you're aiming for is arm timing akin to the $\frac{3}{4}$ catch-up drill explained in the Timing drill box. Sadly, there are no absolutes in swimming so the timing of the $\frac{3}{4}$ catch-up will vary slightly from swimmer to swimmer and male to female. However, the object is, and will be over coming months, to swim with flow and rhythm.

Now, most of you will be more familiar with the traditional full catch-up. It's a pretty easy drill to learn and, as a result, is probably the most overused drill in the world.

Unfortunately, unless you have an incredibly short stroke, it has absolutely no value whatsoever and, in nearly all cases, causes more problems than it will ever solve, evolving from the fact it makes you flat.

That may sound a pretty bold statement but I heard Bill Sweetenham (former UK Swimming Performance Director and coach to numerous world and Olympic champions) tell a group of swimming teachers that they should never use the full catch-up drill!

Right, get in the pool and practise that $\frac{3}{4}$ catch-up.

Timing Drill

Practise this workout and you'll achieve a more fluid and efficient stroke.

Drill: $\frac{3}{4}$ catch-up

1. Keep the leading arm extended until the fingertips of the recovering hand enter the water. Entry should be halfway between the head and the fingertips of the leading hand or just in front of the elbow. The fingertips, wrist and arm should go through the same hole and extend forward at about 4-6in deep. Ensure that entry is in front of the shoulder and that the extension remains at shoulder width.
Crossing in front of the shoulder towards or across the centre line will cause the momentum to be directed at a tangent.
2. As the fingertips enter, the leading arm/hand holds firm against the water. This anchor enables the hip to be driven down and around the axis as the recovering arm begins extending after entering the water.

Note: keep the head and arm close when breathing; keep one goggle in the water when turning to breathe; keep the recovery relaxed. Also, wearing fins can help if you're finding it hard to master the timing. However, don't wear the fins for more than 50% of the time spent practising the skill and do keep a constant leg action.

Jargon Buster

Hypoxic: Deficiency in the amount of oxygen reaching your tissues.

Rebound: The diaphragm separates the chest cavity from the abdominal cavity. As we inhale, it moves down to let the lungs expand; as we exhale, it moves up. The 'rebound' is the return to neutral.

Wave drag: Caused by the waves or turbulence you create when swimming.

Form drag: Pressure difference between swimmer's front and rear, affected by shape, speed and size.