

Stroke Outline

Insertion

How?

Quick, clean and completely vertical – easiest way is to remove the weight of the hands from the top of the handle by raising the straight arms from the shoulders. Do not try and “hurl” the handle in with upwards pressure. This requires a very delicate touch if the blade is not to be sent deep. Releasing the weight from the handle with relaxed hands and shoulders allows the spoon to find its own depth. To keep the motion of the spoon vertical, aim to reach away from yourself as you lift your arms. Since your arms are already at full extension at this point, there will be little or no further reach. However, the natural tendency when lifting your arms is to bring them towards you slightly and this is to be avoided.

When?

The blade should be inserted as soon as you stop sliding forwards. You will need to start to send the signals to your arms just before you arrive in order to make it happen at the moment of arrival.

Feeling?

In sweep-oared rowing, the feeling should be of feeling up and round towards your rigger.

In sculling, the feeling should be of reaching up and out with each arm.

If you have got it right, there should then be a feeling that the oar is locked in the water as soon as you apply pressure.

Speed?

The motion itself should be fast, but as mentioned above, trying to make it too fast may encourage you to “throw” the spoon deep. Very advanced rowers who are looking to remove every moment of wasted time should practise actively “lifting” the spoon in, but the rest of us should be able to make do with “dropping” the spoon in.

Speed onto next part of stroke?

Once the spoon is fully covered and not before, you should move onto the application. If you move too soon, you will not feel an instantaneous locking of the oar since only part of the spoon will be covered when the motion begins.

Application

How?

The shoulders and arms should stay completely relaxed. They are fully extended and so there will be no slack to take up. The back must be held in place and all of the motion comes from the legs. Focus on pushing the knees

down rather than pushing the seat back as this will help you to hold your back still.

Holding the back still is a physiologically difficult thing for beginners who will often do one of the following:

- ▶ Catch with the shoulders – lifting the back to try and hold it in place.
- ▶ Bum shove – pushing hard with the legs and not able to hold the back in place at all.

It is probably preferable to have the latter rather than the former as this will be removed with better strength and co-ordination. Catching with the shoulders is a difficult thing to unlearn.

The ultimate aim is to have the angle between the back and the boat held perfectly constant.

When?

This should happen immediately that the spoon is covered. Any sooner and the spoon will move through the water a little before it locks. Remember that the aim is have the spoon locked still and move the boat – not to move the spoon through the water.

Feeling?

The feeling is of the spoon locking in the water. If the back is not held still, you will feel no pressure in your loose, relaxed fingers. The amount of pressure you feel under your toes should be exactly the same as the amount of pressure you feel against your fingers as the oar resists being pulled.

Speed?

There is a tendency for athletes to try and kick the legs down as fast as possible. However, while the application must be fast in the sense of there being no break between insertion and application, the speed of pushing the legs must be judged to avoid the following:

- ▶ No lock, the blade is being ripped through the water – legs were pushed too fast and too hard. There is no point push fast and hard until the spoon has actually gripped the water.
- ▶ The arms are being pushed towards you – legs were pushed too slowly. The face of the spoon must be pressed against the water.

If you have got it just right, you should feel the lock instantly. This feels like the stroke is going to be solid and firm. Kicking hard will often delay this feeling until you are within the power-phase. The faster the boat is moving, the harder you can afford to push the legs. However, again, do not try and develop all the speed of the stroke at this point. The boat will accelerate throughout the stroke and speed is the result.

Speed onto next part of stroke?

The application part of the stroke is over as soon as it begins and is effectively the first part of the power-phase. There is no noticeable transition between application and power-phase.

Power-Phase

How?

Initially, the shoulders and arms should be completely relaxed, but fully extended. The legs will be the first to apply the power. At some point, the back will join in and then so will the arms. There is an often forgotten extra lever which is the outside shoulder in rowing and both shoulders in sculling. The shoulder is capable of moving forwards and backwards in its socket. At the start of the power-phase, it will be as far forward as it comfortably goes. By the end of the power-phase, it will be as far back as it goes. A constant pressure should be applied throughout the stroke to create an acceleration. At no time should it feel as if this pressure slackens off. The way to maintain the pressure is through good co-ordination of the different parts of the body and, in general, by never letting one part of the body finish before another one has started.

When?

Whole articles could be written on when the different parts of the body should join in and finish. The East Germans did years of research and came up with the result that the co-ordination of the body parts is the single most important factor in making one crew go faster than another (given that both crews were otherwise of an equivalent standard). This basically means that this is important. However, as a rower it is easy to become hung up on wanting to know **exactly** when the body parts should join in. Coaches rarely seem to have the right answer. One answer that I like is that of Al Morrow (Canadian chief coach) who said that there is a spectrum of rowing technique. Within that continuous spectrum there are certain regions which define technique which must be in place for the stroke to be good. However, within those regions, variation is allowed between coaches, clubs, crews, boat sizes, and rowers. This variation is called **style** and may or may not be the difference between a fast and a slow crew.

If rowers within a club are to be able to slip in and out of different crews and different boat sizes, there will need to be some consensus since within a given crew, all members must be doing roughly the same stroke.

Here are some suggestions:

- ▶ The general starting order of the power-phase is:
 - ▶ Legs
 - ▶ Body
 - ▶ Shoulders and arms together
- ▶ Each body part should start before the previous one has finished
- ▶ The body should start sooner in slower boats and wait longer in faster boats. E.g. in a single, the back starts almost as soon as the legs and in an eight or a quad, the legs are almost finished before the back starts.
- ▶ The shoulders can actually be used throughout the whole stroke and enable a smoother transition between each body part.
- ▶ When in a crew boat, **adapt** to what everyone else is doing. With very experienced rowers, this is a natural process which occurs during an outing. Try and feel what the rest of the crew are doing and aim to move

together. If a coach is watching from the side, they can help to bring everyone together. Do not fall into the trap of thinking that there is only one way of rowing. The best rower is a chameleon who tries to blend into a crew. Less experienced rowers should try to blend in with more experienced rowers.

The speed order of boats is roughly (from slowest to fastest):

1x, 2+, 2-, 2x, 4+, 4-, 4x, 8+

Feeling?

During the power-phase, you should feel a constant pressure under the toes and against the fingers. These two pressures should be the same as each other since there should always be a connection between the feet and the handle via the body. If the pressure drops in either feet or fingers, there has been a problem with the co-ordination between the parts of the body.

The constant pressure applied throughout the stroke will create an acceleration, so you should feel the stroke getting faster towards the finish. Since the arms are always weaker than the legs or the back, the end of the power-phase will generally feel harder than the beginning or middle. It is easy to let the pressure off because of this. However, you must endeavour to maintain the pressure as you approach the finish. If there is a sudden feeling of the stroke becoming easier as you approach or enter the finish, then you probably pulled your hands down towards your waist.

Speed?

The speed of the power-phase is entirely dependent upon the following:

- ▶ The speed of the boat (1x – 8o etc.)
- ▶ The pressure
- ▶ Who else is in the boat
- ▶ The “crewness” of the crew
- ▶ The wind and stream

It is possible to put no pressure in and still move at the same speed as everyone else which makes them do all the work. It is also possible to put more pressure in than everyone else and end up doing too much work without improving the speed of the boat.

The aim should be to put in as much work as is required for the pressure, but be aware of pacing over distance and the limitations of yourself and the crew. You will have to keep pressure up throughout a race/piece.

Speed onto next part of stroke?

The power-phase leads directly onto the finish which may be considered part of the power-phase.

Finish

How?

The finish is that part of the stroke which finishes off the power-phase. We can think of it as a separate part of the stroke since it is often done wrongly. A

correct finish is simply a maintenance of the pressure applied during the rest of the power-phase. There is a tendency to try and increase the pressure in order to try and make the boat accelerate. However, the focus should really be on not reducing the pressure. Keeping a constant pressure will actually produce an acceleration. The difficulty arises because the arms are working more or less alone at the finish and are weaker than the rest of the body. Effort is therefore required to maintain the pressure.

The most common errors at the finish are:

- ▶ **Pulling it down to the waist (washing out with the spoon)**

This may be caused by weakness in the arms (biceps and triceps) and, more particularly, the upper back (latissimus dorsai, trapezius etc.).

It may also be caused by the rower trying to apply more pressure than is required at the finish (or more than they are capable of).

Yet another cause is trying to hold the finish in **after** the rest of the crew have extracted. Only superman is truly capable of adding to the boat speed after extraction should have occurred. Extract with stroke – even if you are not ready yet.

- ▶ **Yanking the finish through.**

This is usually caused by a lack of understanding of the finish. Rowers are told to “send the boat” by keeping the finish solid and this is often misinterpreted (or mis-explained) as “pull harder at the finish”. Most rowers try too hard at the finish (but don’t use this as an excuse to slacken off).

This may also be caused by a release of the pressure at the finish which is usually in itself caused by the hands dropping toward the waist at the finish.

- ▶ **Sending the spoon deep (pulling up the finish)**

Another thing which rowers are often told is “pull up at the finish”. This is an attempt by coaches to avoid a negative – “don’t pull down at the finish”. This is then often overdone by rowers who actually attempt to pull higher into the finish. Perhaps what we should say is “keep the handle at the same height above the saxeboard throughout the stroke and pay particular attention to this as you approach the finish”. The boat will, in fact, rise during the stroke and so you will be pulling slightly higher at the finish. If you think about what the spoon is doing instead of the handle, then we should say “allow the spoon to find its own depth at the insertion, keep it at that depth throughout the stroke and be particularly careful not to let it rise out at the finish”.

When?

It is difficult to say exactly when the power-phase becomes the finish, but most problems tend to start as the legs finish off and the arms are left to work with the end of the back motion or even by themselves. The legs must be held down. It is a very common mistake to let the legs rise as the finish is pulled in.

It is often useful to think of the power-phase as one long finish. You should mentally be aware of where your finish should be from the moment you insert the spoon. This idea of knowing where you are going next is an advanced and tricky concept, but most high level rowers don’t really think about what they are

doing. Instead they think about what they are going to do. As they put the spoon in, they think finish and extraction. As they set off up the slide, they think insertion.

Feeling?

The general feeling at the finish is “ooph, that hurts”. It feels like hard work. It also feels faster than the rest of the power-phase. In a together crew, it feels solid and productive. It also feels easier than in a not-together crew where it will feel heavy and you may find yourself washing out if you attempt to do a good finish.

The finish should not feel like a sudden burst of hard work. It is the smooth culmination of the pressure which has been applied throughout the power-phase.

The feeling is also that you are pulling up. The natural tendency at this point is to pull the hands down, so as you pull through horizontally, you may feel that you are actually pulling up. Remember that your hands are at chest-shoulder height at the insertion, but at stomach-chest height at the finish. However, this is **not** because your hands have dropped, but because your body has moved.

The forearms should be horizontal at the finish which means the elbow should stay up and pull past the body. It is common to see rowers dropping their outside elbow and hence their outside shoulder.

In sweep-oared rowing the outside hand should be perpendicular to the handle at the finish. This means that the body should rotate **slightly** with the outside shoulder having pulled further than the inside. The shoulders and chest should be parallel to the handle. This rotation is not cosmetic. It can add extra force into the stroke. At the insertion, the body has a little rotation with the outside shoulder ahead of the inside whereas at the finish, the outside shoulder has passed the inside one. It overtakes somewhere as it is passing the pin. Think shoulders parallel to the handle.

In sculling, both hands should be perpendicular to the handles at the finish. This means elbows past and beyond the body (forearms horizontal, wrists flat), but sticking out slightly.

A quick and careful glance at the wrists, forearms etc at the finish will tell you if you are doing it correctly.

Speed?

A lot of time is spent talking about a fast finish, but it may be more appropriate to think more in terms of pressure. The speed of the finish will depend upon the speed of the power-phase and the pressure applied. It should be faster than the rest of the power-phase, but not through forceful means (yanking). There is often a tendency to slow down at the finish as it becomes hard work and this should certainly be avoided. If the pressure is very high there can be a feeling of coming to a stop at the finish.

Speed onto next part of stroke?

The finish leads straight onto the extraction without a break. However, mentally you should try and imagine that you are stopping the oar before instantaneously moving onto the extraction. Otherwise, it is possible to combine the two and end

up pulling the handle down to your waist during the finish. However, you must be careful not to actually stop before you do move on. The actual effect is a sudden change of direction of the handle.

Extraction

How?

At the end of the finish, the direction of the handle must be changed from horizontally towards the body to vertically downwards. The “shape” of the motion of the handle should be nearer to rectangular than round – the most common mistake being to tap down before the finish is complete. So, the aim must be to complete the finish, stop pulling and instantly tap down.

The tap down is done purely with the forearms. The shoulders should not be involved and the wrists should be kept flat in both sculling and sweep-oared rowing. **Feathering is not part of the extraction.** The extraction should be done completely square-blade.

Many rowers feel the need to tap right down as far as they can, but the tap-down should only be as far as is necessary to lift a **square** spoon out of the water and allow a small clearance. In boats with poorer balance, the crew may need to tap down further.

When?

Immediately after the finish and before the feather.

Feeling?

If the finish has been a good one and is together with the rest of the crew, the extraction should feel easy. You should feel like you are pushing slightly away from you since your elbow will move slightly forwards. However, the hand is actually moving vertically down.

If the extraction feels difficult and “sticky”, the cause may be one of the following:

- ▶ You did not finish with the rest of the crew. Timing of the finish is more important than completing your own finish, though this should be corrected in future strokes of course.
- ▶ You slowed down into the finish. A puddle opens up behind your spoon as you pull during the power-phase and finish. If you or your crew reduce the pressure before the finish, some or all of you may have difficulty extracting.
- ▶ You or your side pulled down at the finish. If you pull down at the finish, you may rip your oar through and your puddle may close. On the other hand if more than one of you on your side pull down, the boat may drop down to your side at the finish, leaving you no room to complete the extraction.

Speed?

The extraction should be quick, but it is important not to be violent about it. It should be a smooth link between the finish and the recovery.

Speed onto next part of stroke?

The next part of the stroke is the hands away of the recovery. There should be no pause before you start on this. The feather is part of the recovery and not part of the extraction!

Feather

How?

The feather is done with the fingers, the wrists and the flat back of the sleeve on the oar.

The most common mistake is to grip the oar tightly into the palm and use only the wrist. This will lead to the forearm seizing up during a hard piece such as a race and, in the long run often leads to injury of the forearm. Teno-sinovitis is an inflammation of the tendon sheaths which needs treatment by rest (i.e. **NO** rowing for some time) and can even need treatment by surgery. Avoid it by feathering correctly.

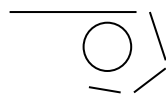
As with all other parts of the stroke, the grip should be relaxed. The feather is a roll of the handle into the fingers (especially in sculling) using the fingers and the thumb. A small motion of the wrist may be needed to start the motion off, but if the hands are relaxed and loose, the flat back of the sleeve should finish the motion off for you. Once you have used any wrist motion, you should flatten the wrist back off and let the handle rest up against the fingers instead of the palm. The wrists should be kept flat throughout the recovery. In sculling, remember to keep the thumbs against the ends of the handles.

The feather is a smooth, non-violent action. Many rowers seem to think it should be hard and noisy (i.e. make a satisfying clunk), but remember that noise is made by energy and any energy making noise is not moving the boat – i.e. it has been wasted.

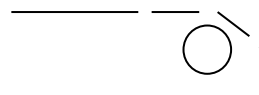
It is important that the height of the handle does not change during the feather as this will also affect the height of the spoon which should be just above the water when squared. The easiest way to achieve this is to feather only with the inside hand. Keep the outside hand as a loose grip which maintains a constant height.

End on view of the handle and inside hand during the feather.

Square



Feathered



When?

There is no hard and fast rule as to when the feather should be done. The feather is really there to prevent problems if the balance is not perfect or to allow the spoon to pass untroubled over rough water. In a headwind, it also reduces drag. However, in the grand scheme of the stroke it is not important

and, if for some reason, you cannot fit it in, then don't. In a tailwind, you may wish to delay the feather so that the spoons act like sails.

What this boils down to is that the timing of the feather may be varied depending upon the crew or the conditions. In general, the feather should take place as the hands are moving away from the body at the start of the recovery and before the knees start to rise. However, for beginners, it is often useful to delay it a little, to ensure that the rower has time to finish off the extraction before needing to worry about the feather.

Feeling?

It should feel easy, smooth and relaxed.

Speed?

The speed of the feather is not too important. Trying to do it too fast often leads to a violent and noisy finish with a tense arm and tight grip. All of these are to be avoided.

Recovery-Phase

How?

The basic premise of the recovery phase is to prepare yourself for the next stroke and recover from the previous one. This should be done with the minimum disturbance to the motion of the boat. As you set off up the slide, the boat will speed up slightly, but it will then slow down until you reach the next power-phase.

We could minimise the amount of slowing down by moving quickly up the slide. However, this would give us very little time to recover – possibly exhausting ourselves before the end of the race – and would make it very difficult to control the insertion and start of the power-phase without slowing the boat down – remember, the feet are pushing against the motion of the boat as you reach front-stops.

On the other hand, moving too slowly up the slide, while giving us sufficient time to recover, means that the boat has slowed significantly before the next power-phase and more work is then required to get the boat back up to speed. A compromise must therefore be reached.

Hands Away

The hands away part of the recovery is really just an extension of the finish and extraction. The hands should continue to move at the same speed as they were moving in towards the body at the end of the finish. The tendency is to let them slow down and you will often hear coaches saying “fast hands”. This may lead to rushed hands, so it is important to remember that what is really meant is “keep the hands moving at the same speed as they came in at”. If the hands are rushed, the boat has no time to “run” before you are moving onto the next stroke. Remember though, that hands too slow means the boat drops in the water and slows down. The hands should leave the body horizontally. Once the arms are straight it is time to move onto the body swing.

Body Swing or Hip Pivot

The body swing should be seen as a pivot in the hips. The back should be kept in a straight, though relaxed position. You are not looking for a ramrod straight back, but the idea is that the motion is all in the hips, not the middle of the back. This is very important, since persistent bending of the back, twisting at the catch and then loading with the legs, all combine to cause possibly irreparable back injury. Prevent this by pivoting at the hips.

At this point, the seat is still. There is often an incorrect urgency to keep the seat moving. The seat actually remains still from the point when the legs finish driving until after the body has swung over. However, a major limitation in the amount of pivot you can get without bending the legs (and hence moving the seat) is the flexibility of the hips. This basically boils down to the length of the hamstrings. Their length is affected by age and training. The older and less well trained your hamstrings are, the shorter they are likely to be. If you cannot pivot the body forwards past the vertical, a **temporary** solution is to allow the knees to just break (1/8th slide say) as you bring the body over. The more permanent and correct solution is to do flexibility training on the hamstrings to lengthen them. This becomes more important the further beyond about 20 years old you get. However, it is important at **all** ages. Research has shown that most back injuries in rowing are due to a lack of flexibility in the hips due to short hamstrings or to weak hamstrings (we spend a lot of time on our quads – thighs – but relatively little on our hamstrings – backs of thighs).

One thing to focus on when pivoting is keeping the arms straight. There is often a tendency to allow the arms to bend again during the pivot. Also, make sure the hands do not drop lower during the pivot. Try and feel the weight of the handle pressing up against your relaxed hands. If this remains constant, the handle height has not changed.

The speed of the pivot should be controlled, but not slow.

Moving onto the slide

As soon as the pivot is complete, the seat should begin to slide forwards. Many people do this by pulling up against the shoes or straps with their feet. However, this is wrong and leads to poor control of the slide and the balance during the recovery. You will often hear coaches telling crews to get their weight into their feet during the recovery. What this means is that, as you pivot over, you should relax the knees and let the soles of the feet press completely against the stretcher. One way to achieve this is to just break the knees slightly (1/16th slide say) to help them relax.

Once your weight is in your feet, move up the slide by lifting your knees upwards and forwards. This will keep your feet in contact with the stretcher and help to keep the balance stable. Another way to think of this is to move yourself up the slide by pressing back on the back of your heel (i.e. Achilles tendon area). By keeping some pressure against your feet, you can control the speed at which you move up the slide.

The speed on the slide depends on the following:

- ▶ The speed of the boat

The only factor in how fast you come up the slide is the speed of the boat. You should actually be sitting still relative to the water (remember the water is

moving, so this will not necessarily be the speed of the bank) and the boat should be doing all the moving underneath you. What this means in reality is that you need to move up the slide at the same speed as the water is moving past the side of the boat. A quick glance down will help to check this. However, the tendency is to rush up the slide, so coaches often get rowers to go extra slow up the slide to help them develop sufficient control. This should be treated as an exercise and the above borne in mind.

Approaching Front-Stops

The speed on the slide is more or less constant all the way to front-stops. However, the tendency is to speed up, so it may help you to think about slowing down or using extra control into front-stops (remember the weight in the feet – your heels may rise if your ankles are not flexible enough to allow them to stay down). As you arrive at front-stops, there are several things to think about.

- ▶ Your shins should be vertical when it is time for the catch (insertion and application). It is easy to keep going until you have to stop, but this is often too far.
- ▶ Your body should be fully prepared in the catch position
 - ▶ Arms straight
 - ▶ Body over
 - ▶ Slight rotation to keep shoulders parallel to oar handle
- ▶ You **must** have **already** squared.
- ▶ The spoon should be almost touching the water ready for the insertion.

Speed onto next part of stroke?

At this end of the stroke, the seat does not sit still. The **Recovery** leads straight onto the **Insertion** which leads straight onto the **Application**.

Square

How?

Roll the hand back up into the normal pulling position. The handle should move from the fingers back into the palm and roll back to the square position in the process. Remember that in sweep-oared rowing, only the inside hand is rolling the handle back while the outside hand forms a loose grip which keeps the handle at the correct and constant height. The wrists should both remain flat.

When?

There is no hard and fast rule about when to square. However, it must be completed by the time you arrive at front-stops. The less experienced the crew, the sooner it should be finished. Remember that squaring does not happen instantly. If it is to be finished by front-stops, it must start sooner than that. For a gentle square, it is best to start squaring as soon as the hands pass the ankles. For beginners, lots of square blade rowing is recommended. When they do start feathering, the feathering should be delayed until well into the hands away and the squaring should be done almost immediately afterwards. By varying the timing of the feathering and squaring as a coach, it is possible to remove the link between the extraction and the feather and between front-stops and

squaring. Seeing the feathering and squaring as independent parts of the stroke makes a rower much more adaptable to different crews and conditions.

Remember that squaring early in a badly balanced boat is impossible, so when practising squaring in a less experienced crew, try and ensure that there are always some members of the crew sitting the boat. Bad balance leads to bad learning of the feathering and squaring actions.