EVERYTHING YOU EVER WANTED TO KNOW ABOUT RIGGING BUT WERE AFRAID TO ASK

What's it all about anyway?

Athletes come in different shapes and sizes, levels of fitness and skill. The same rig won't suit them all, so we can either change the athlete to suit the boat or alter the boat to change the athlete. Things we can change are:

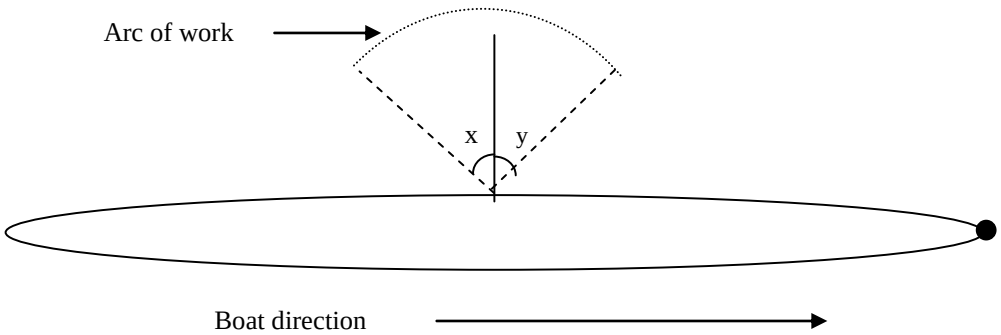
- Stroke length
- Catch position
- Finish position
- Blade depth through the stroke
- Gearing

We do this by altering

- The stretcher
- The riggers and pins
- The blade length

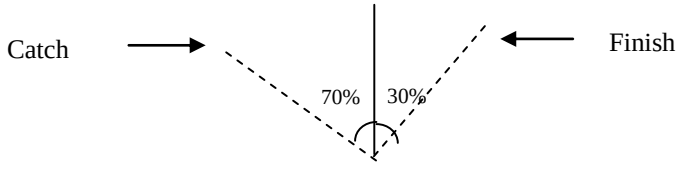
The stretcher

Moving the stretcher backwards or forwards changes the arc of work:

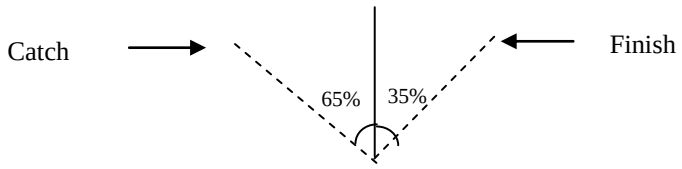


In sweep-oar rowing this arc (x + y) is about 90° and in sculling about 110°. In a faster boat (e.g. an eight) you want more work in front of the pin, and in a slower boat (e.g. a single scull or heavy touring boat) more work behind the pin. The aim is to exert maximum power when the oar is at right-angles to the boat. You also want the athlete to be comfortable in the boat, especially being able to extract the oar or sculls cleanly at the finish. Plus you want the whole crew to finish at the same position, so it's all a big compromise really.

Effect of moving the stretcher forwards (further away from the athlete):



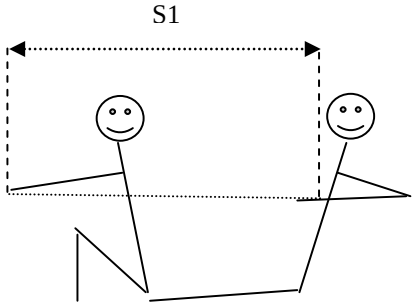
Effect of moving the stretcher backwards (closer to the athlete):



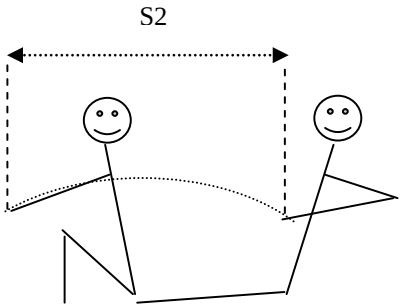
You can also adjust the height and angle of the footplate. Ideally you want to have the drive to be as near horizontal, but people's ankles have different degrees of flexibility, so you may need to set the footplate lower in order for them to attain vertical shins at the catch. If the footplate is set too high, the rower will not be able to achieve full compression or rock over from the hips, and in addition the boat will be less stable. The angle of the footplate can usually be adjusted - most people find an angle of between 42° and 45° suits them.

The riggers and pins

The main adjustment is the height of the work, which should be set so that the rower can pull in a straight line with the handles finishing just below the chest, producing a long stroke.



If the pin is set too low, the rower will pull the oar in an arc, producing a shorter stroke:



The typical height range is 16cm – 19cm for sweep oar, 15cm to 18cm for sculling. The bow side swivel in a sculling boat will typically be about 1 cm higher than the stroke side, to allow for the position of the hands at the crossover.

The stroke length is also determined by the spread (the distance from the centre of the boat to the pin). The spread should be reduced for a shorter crew and increased for a taller crew in order to maintain the correct angle and arc of work. In sculling we measure the span (distance between the two pins) rather than the spread. However, you should always check the spread to make sure it is the same both sides.

These days most coxed fours are rigged with a spread of 85.5 cm (half a cm less for coxless) and most scullers go for a span of 159-160 cm. However, a very tall sculler may find that a span of 162 cm gives a longer arc of work, while a small junior will feel more comfortable with a span of 158 cm or less.

The span/spread is also reduced as the boat speed increases – the span of a double scull will be about 1 cm less and a quad about 1½ cm less than a single. An eight will have a spread about 1 cm less than a four and 2 cm less than a pair. This enables the oars/sculls to be set with heavier gearing (less inboard) – see below.

Pitch

Pitch is the angle of the pin from vertical. There are two planes of movement:

- Towards the bow or stern
- Inwards or outwards

You need some pitch to hold the oar in position in the water, since the oar is not horizontal when you pull on it, but angled downwards. About 4° is normal, which used to be set by having angled blades but these days is done using the plastic inserts in the swivels. You need to ensure that the pin is vertical, otherwise the pitch will vary through the stroke (see below).

What is lateral pitch?

Some people like to have a little more pitch at the catch to prevent the oar going too deep and a little less at the finish to make it easier to hold the blade in the water. So how do we achieve this?

1. You could try setting stern pitch, but this will give less at the catch and finish and more in the middle, giving a good finish, but a poor catch and drive. Setting the pitch towards the bow has the opposite effect, giving a good catch but poor finish and drive. **So this is NBG!**

2. You could have neutral pitch (pin vertical), giving the same angle throughout the stroke. This will suit most crews.

3. Now for the clever bit (someone with a degree in maths might be able to explain this!). If you angle the pin outwards, you really do get more at the catch and less at the finish. 1½° of outward pitch gives you 5° at the catch, 4° in the middle and 3½° at the finish, assuming you are using 4° inserts. **Ideal, but difficult to achieve! NB.** If the pin in angled inwards, this will have the opposite effect, making the boat difficult to row, so must be avoided at all costs.

Blade length and gearing

Taller people need longer oars than shorter people. Seems obvious, but why? Because they have longer arms and legs! As we said above, the span should be set wider for tall people to achieve the same arc of work. This means the inboard of the oar will need to be greater so that they can reach right out to the catch and draw through at the finish. You don't want less outboard as this will shorten the stroke length, so you need to start with a longer oar or scull.

So how do we work out what the inboard should be? First decide how much overlap you want. A tall, elite sculler will want more, enabling him/her to reach out further at the catch. A short or beginner sculler will want less, so that there is enough separation between the handles at the finish to enable him/her to push the hands down and away. For general club use, 15 cm is about right. The inboard will be half the span plus half the

overlap. So if the span is 160 cm, half of this is 80 cm. Half of 15cm is 7.5 cm, giving us an inboard of 87.5 cm. For junior beginners where the span may be 158 cm and the desired overlap 12 cm, the inboard will be (158 + 12)/2 = 85 cm.

Gearing is the ratio of inboard to overall blade length. If it is too high, then rowing will be very hard work, resulting in a "two part" stroke where the rower is unable to maintain pressure through to the finish. If the gearing is too light, the crew will have to take more strokes to achieve the same amount of work, pushing the rating up which uses up energy. So the level of fitness of the crew also needs to be taken into account.

Because cleavers have bigger spoons than Macons you need less outboard, so you have a shorter blade – typically 10cm shorter than a Macon for the same crew. Typical oar lengths range from 372 cm (lightweight women) to 378 (heavyweight men) and sculls from 286 cm (lightweight women) to 292cm (heavyweight men).

You also need to adjust the gearing for the type of boat – rowing an eight is easier than rowing a pair (you have seven people to help you) so you can cope with a higher gearing.

So the inboard depends on a number of things, but principally:

- The rower (height, level of skill fitness)
- The type and span of the boat

Typical inboard oar lengths are 114cm for an eight, 115cm for a coxed four and 116cm for a coxless pair, and scull lengths 88.5cm for a single, 88cm for a double and 87.5 cm for a quad. These lengths are taken from statistics for international crews, who are generally tall with long legs. Lesser mortals will require shorter inboards!

Points to remember

- All rig changes the way you row
- Some rig changes are designed to change the way you row
- Adjustable rigging is for the benefit of the athlete, not vice versa
- Rig requirements will vary from time to time (as you get fitter and more skilled)
- All crew members do not have to be rigged the same, but it is a good starting point.
- Adjust one thing only, then try it out
- Keep a note of measurements, how it feels/looks, how it affects the boat speed (do timed pieces)

Order of adjustment

Start with the easiest thing first:

- Stretcher placement
- Height of feet
- Swivel height
- Oar/scull length and inboard
- Pitch
- Spread/span

In case you were wondering…

No, I didn't make this up. All the above information came from Gordon Burton and Nigel Weare of British Rowing who REALLY know about rigging.

Caroline Turnbull
Revised 26/08/2016