Technical Exercises or Drills

The simplest way to improve technique is giving feedback to a rower during normal rowing or after it. However, technical exercises or "drills" appeared to be the most effective tool for technical coaching. When doing drills, the biomechanics of normal rowing is modified in such a way, which allows to focus on a specific part of the stroke cycle, emphasise it, make it easier or more difficult to do. We would classify a big variety of drills by the following three factors:

- Mechanics: static or dynamic drills.
- Level of details: for elements of sequences.
- Standard or modified mechanical conditions.

Static drills target rowing kinematics: positions, angles, etc. These are the most basic drills and usually beginners start with them: e.g., they stop at the catch position, see and feel where their handles, blades, body segments and hear coach's comments on them. Then, they stop at finish, etc. Sequences could be trained with series of fixed positions and slow transitions between them.

Dynamic drills are more advanced and target rowing kinetics: pattern of force application (force curve), rhythm (pattern of velocity) of the stroke cycle or its elements (drive, recovery), optimal activation of muscle groups, etc. Examples of effective dynamic drills: 1) catch with short legs drive until knee angle 90° - emphasise "kick" the stretcher through toes and knee extension using quads; 2) rowing half-slide, catch at knee angle 90° with "kicking" the stretcher through the heels – emphasise pushing knee down and hips extension using hamstrings and gluts (RBN 2007/07).

Drills for elements are performed with focusing on one or a few elements of the stroke, which allows their more intensive improvement: e.g. catch only, finish with arms only, oar feathering-squaring, etc.

Drills for sequences target better coordination of elements: e.g., sequence of activation of legs, trunk and arms during the drive and recovery, sequence of the oar squaring and entry at catch, etc. A good example could be cyclic performing the Dynamics dill 1 above, say, for 3 strokes, then drill 2 for 3 strokes, then 3 strokes - combination of them with focusing fast switching between quads and hamstrings-gluts.

Drills can be performed at standard or modified **Mechanical Conditions**: e.g. external resistance can be increased with water brake or heavier gearing, or decreased with towing or lighter gearing, which makes rowing conditions heavier-slower or lighter-faster. The first sort of these drills is very often used for training of rower's specific strength-power; the second sort is used sometimes for speed training (RBN 2004/05). Also, various gadgets can be used (RBN 2004/04, 2005/04), which restrict or modify mechanical conditions of rowing.

For quality coaching, it is important to have sufficient "toolbox" of drills, to choose a correct drill for a specific technical problem and fix it up in the most effective way. This is the "art" of coaching, which is based on a coach's ability to see-identify-understand the problem and then to choose the most effective "treatment". We will try to give some general rules and advice, which may help.

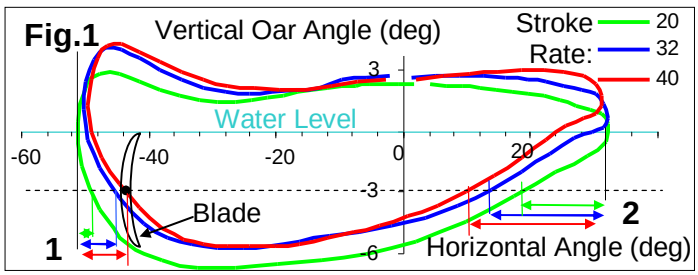
If your target is to win races and not rowing for recreation, you should **always refer technical drills to the racing speed and stroke rate**. Very often, "a technical session" means very slow rowing with stops and static drills. It could be good for teaching beginners, but at advanced level it is necessary to include also fast drills. There are a number of reasons for it:

1. Mechanical conditions are very different at slow and fast rowing, at low and high stroke rate: they are as different as walking and running. Inertia forces are negligible at slow rowing, but at high stroke rate they play a decisive role and change biomechanics dramatically. E.g.: when stroke rate is changing from 20 to 40 min^{-1}, rowing rhythm is changing from 35% to 55% (RBN 2012/05) and inertial losses increasing from 3% up to 7% (RBN 2010/05).

2. Mechanisms of motor control are different at low and high speed movement. At low speed, an athlete has enough time to receive immediate feedback (visual and from proprioceptors) about his body position, so he can control the movements and correct them in real time. At high speed, the quickness of the neuron-muscle loop is not sufficient to control movements at the conscious level, so its pattern should be programmed before the movement starts as it is not possible to control it in real time.

3. It is important to economise correct technique, i.e. perform it with the highest efficiency and proper muscles relaxation, which should be practised at racing stroke rate.

As an example, Fig.1 shows some very common profiles of blade work at stroke rates 20, 32 and 40 min^{-1}. The catch slip increases from 5° at rate 20 up to 10° at 40 (1) and release slip increases from 7° up to 17° (2). This happens because the vertical angular velocity remains the same, but horizontal velocity increases nearly twice at higher stroke rate.



If a rower targets improvement of blade work at racing speed, he needs either to increase vertical handle velocity proportionally at higher rates, or exaggerate it at lower rates. Both ways make sense and could be practised with drills "catch only" and "finish only", when a quick short vertical movement of the handle is emphasised at various stroke rates.