

A Comparative Analysis of the GDR and Adam Styles

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Introduction

Coaches, in their attempts to perfect rowing movements, constantly discuss rowing technique. They pursue new developments and search for new and objective data. Rowing technique, however, is only one of several factors involved in performance. In our opinion, rowing performance depends on careful development of four major areas:

- athlete's personality,
- rowing technique,
- overall conditioning of the athlete, and
- equipment.

The rate at which rowing will improve is dependent upon the creative and practical work of the coaches and scientists. Scientific research to find the technical optimum depends on the measurement and research devices available and on an understanding of the factors determining performance. This research must also be carried out on elite athletes if the results are to be valuable. However, the coach cannot depend on this work alone. The coach will never be relieved from the practical search for the technical optimum, and therefore rowing technique will always be a subject of discussion among experienced coaches and coaches just starting to work in the field.

Because of the oarsman's limited mobility in a boat, however, the coach's options are few, and there are certain common misconceptions about rowing technique that can be observed in crews at rowing competitions. In these notes I will discuss the current trends in the length of rowing stroke and its relationship to the length of slides.

Length of the Rowing Stroke

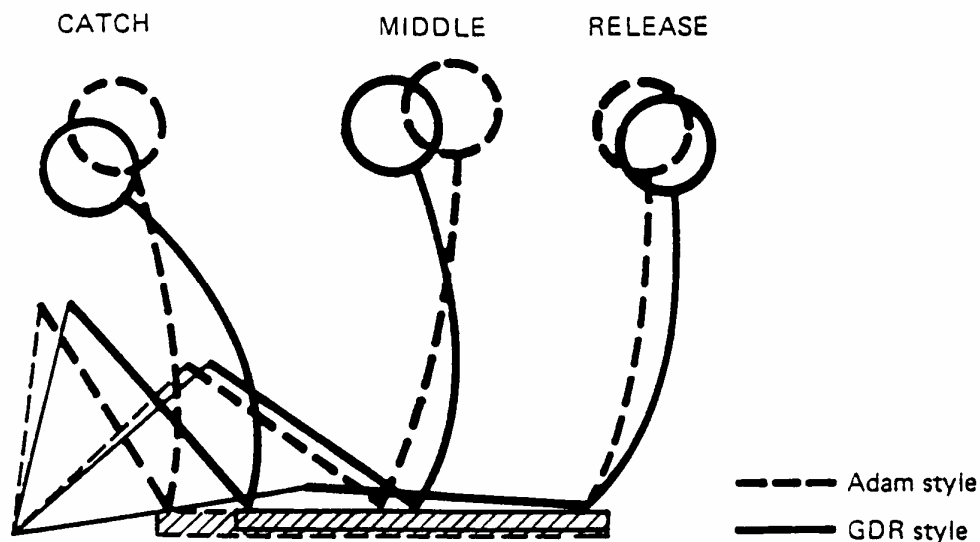
Although no quantitative research data is available at present, it is evident to all observers at recent World Championships and other international regattas that stroke lengths have increased. We estimate that the average sweep stroke length approximates 85 to 90 degrees and the sculling length ranges between 100 and 105 degrees. The arc length of the handle is therefore about 170 cm to 180 cm for sweep boats and 150 cm to 160 cm for sculling boats. This range has been observed in all the top crews, regardless of the technique they use. During the 1976 FISA Coaches' Conference in Stockholm, Dr. Peter Klavora of Canada analysed the three styles that dominated the years 1974-76. He called them **the**

Adam style, the GDR style and the Rosenberg style. Our research in 1976 led us to similar results. Essentially, we identified two basic technical variants: **the Adam style and the GDR style.**

The Adam style is characterised by a long slide length of 80 cm and an acute angle of the knees at the catch, both of which result in a reduced initial forward body swing. The GDR style is characterised by a standard slide length of 72 cm which necessitates an extreme forward inclination of the upper body and less knee compression at the catch. The so-called Rosenberg style is also based on a standard slide length of 72 cm and is therefore considered with the GDR style. It has a major fault, however, which is shooting the slide. Therefore, we do not consider this way of rowing a major international rowing style as proposed by Klavora.

Because the GDR style is fairly widespread, we will call the rowing technique based on the slide length of 70 cm to 72 cm the **standard slide technique.** This technique has been in use for some time and evolved from the standard technique of earlier years which was based on a 65 cm slide length. Other components of what was the standard style have remained virtually the same. In the Adam style, however, the **long slide technique** is intended to enhance the oarsman's physical efficiency by changing many of the components of the overall technique. The major differences between the two during the drive phase of the stroke are illustrated in Figure 1.

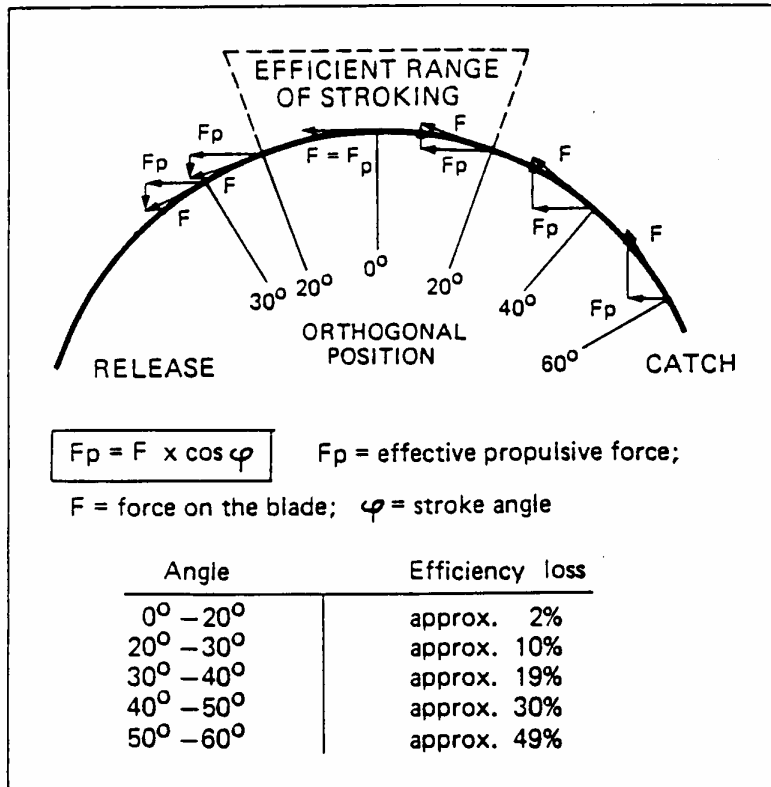
Figure 1: Differences in body action between the Adam and the GDR rowing styles during the drive phase of the rowing stroke (from P. Klavora, FISA Technical Bulletin, p. 29, 1977).



Rowing techniques correlate to the length of racing shells. When Karl Adam was developing the long slide technique in the late 1950s and early 1960s, he hypothesised that the more he brought the rowing stroke into the efficient angle, the greater the efficiency of the technique would be. Therefore, he emphasised the central part of the stroke and developed shorter boats that would respond properly to such an application of power. A high rate of stroking was another ingredient for propulsive efficiency with this new technique. This stroke was called the **nucleus**

stroke (Kernschlag). It was directed towards a full utilisation of the efficient or economic angle (see Figure 2).

Figure 2: Efficient (economic) range of stroking and approximate losses in effective propulsive forces at various stroke angles.



From 1964 to 1968 there was a gradual return to the longer and narrower boats that are being used at present. The longer boats do not react sufficiently to the short quick stroke, therefore the emphasis has changed from the central part of the stroke to what is known as the **long stroke** (Schubschlag). Attempts to develop more propulsion in the longer, narrower boats by lengthening the slide and/or shifting the oarlocks within the economic angle did not lead to any major successes. Research showed that the desirable point of maximum power application should be within the orthogonal range, or right-angle position of the oar to the boat. Therefore, the coach again had to modify the technique to maximise the run of the boat with its new hull shape.

The main task was to lengthen the propulsive phase. Increasing the stroke length in order to give the boat more run, however, put the oarsman once again into an inefficient position. In order to exploit the advantages of reduced resistance inherent in the longer and narrower hull designs, the oarsman had to develop more power throughout the drive and at the finish. Ten degrees more reach at the catch meant that the oarsman had to begin the stroke approximately 50 to 60 degrees in front of the right-angle position; thus the stroke began at an inefficient angle with a loss of available propulsive energy of about 50% (see Figure 2). At present, this power loss cannot be avoided if the stroke length necessary for top international performance is to be reached. For a stroke length of 90 degrees, the catch must be made at about 55 to 60 degrees in front of the right-angle position and the finish must be approximately 30 to 35 degrees behind it. In sculling, the overall arc of

100 to 105 degrees means that the oarsman reaches even further into the inefficient part of the angle; this variation results from the different lever situations and oarlock positions of sculling and sweep rowing. According to our observations, these stroke lengths can be reached by oarsmen using both the standard slide and the long slide techniques.

The GDR Style or the Standard Slide Technique

The standard slide technique is based on the optimal co-ordination of three major muscle groups: legs, trunk and arms. The relatively obtuse angle of the knee at the catch position is necessary for extreme forward body swing. Fully stretched arms are also important. The initial push of the legs should be only moderate so that the upper body can move out of the acute angle at the catch without being overpowered.

As Klavora pointed out, the upper body must travel a greater distance than the slide, and the arm pull begins only when the upper body and legs have overcome the greatest resistance, approximately when the hands are just in front of the knees. The co-ordinated action of the three main muscle groups ensures their optimum utilisation throughout the drive. If the legs push too strongly at the beginning of the stroke, the muscles at the acute hip angle will be overpowered and will result in the seat "shooting." Power will not be properly transmitted to the blade and the optimal efficiency of the stroke will be reduced enormously, because the rest of the drive will depend on the isolated action of trunk and arms. The basic disadvantage of the standard slide variant, therefore, is that it does not permit full utilisation of the most powerful muscle group - the legs. This variant also places great stress on the lower spine. The back pains that may result can, however, be helped by appropriate gymnastic and other exercises.

The Adam Style or the Long Slide Technique

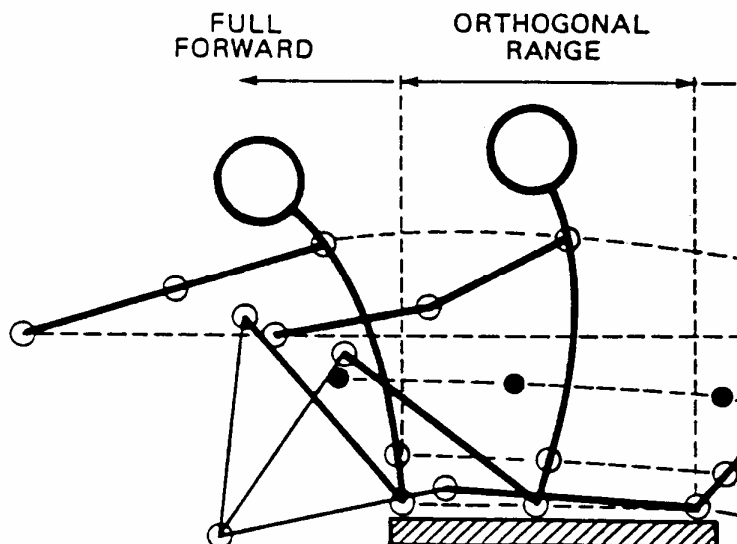
The long slide technique developed by Adam is intended to utilise fully the power of the legs by changing the angle and height of the footboard, as well as its distance from the seat. The acute knee angle at the catch that results from this change and sliding through a longer distance (80 cm) reduces the utilisation of the trunk, but at the same time the danger of pushing the seat is that it is more difficult to couple the arm pull and the very powerful leg drive. A strong and effective finish is thus more difficult to perform. This technique puts a lot of strain on the knee ligaments because of the acceleration of the slide on the recovery that is necessary to develop the acute knee angle at the beginning of the stroke. Furthermore, we emphasise slowing down the slide speed on the recovery so that the upper body is not too harshly absorbed at the catch. The shifts of weight and the position of the centre of gravity during the stroke cycle are aspects that require further research; thus far the problems they present have not been resolved adequately.

Technical variations in international rowing have been reduced to the above two, both of which are based on different views of how best to harness physical performance and efficiency. Both can achieve the stroke lengths necessary for the optimal utilisation of today's boats and therefore both are acceptable.

Summary

In summary, the major features of the preferred rowing stroke of our crews are demonstrated in Figure 3 and are the following:

Figure 3: Displacement of neck, handle and hip during the drive phase of the stroke.



1. The body should be leaning far forward at the beginning, with an inclination of about 60 to 70 degrees from the horizontal line. The knee angle should be compressed, but not to an extreme position.
2. Legs and trunk should move simultaneously after the catch.
3. The leg push should be combined with a long upper body swing. The arm pull should begin when the hands are about at the level of the knees.
4. Legs and trunk should continue their full range of motion until the finish at which point they stabilise the increasingly strong arm pull.
5. The arms must be pulled forcefully right to the lower ribs.
6. After the blade leaves the water and the hands swing away with the oarhandle, the trunk moves out of the bow and is followed by the seat in an easy and controlled manner. The proper synchronisation of these motions ensures a free shift of the athlete's weight sternwards and results in a smooth run of the boat.