

5 *General Fitness Training*

5.1 Introduction

Fitness may be defined as the successful adaptation to mental and physical stress encountered in life. General Fitness Training may be defined as a scientifically-based and systematic training programme to provide the athlete with the basic means to adapt to the physical load encountered through controlled exercise.

Adaptation begins by subjecting the body to a physical load through controlled exercise. Subjecting the body to a sufficient level of physical activity, to cause fatigue, provides the load on the body. After the body has had an opportunity to recover by resting, the body will adapt to this load. The adaptation will now allow the body to be subjected to the same load without becoming fatigued.

5.2 Main features of sport training

Goal-oriented

Training should always be aimed at achieving an increased individual performance level.

Group training

Although training is an individual matter, training in groups is more economical and provides the necessary emotional support for mobilising performance potential.

Effective training

A training programme that provides for increasing physical demands on the athlete will be more effective in developing the athlete's fitness level.

Systematic training

A training programme must be orderly in method or planning.

Scientific training

A training programme must be based on scientific principles.

Role of the coach

The coach's responsibility is to assist the athlete in all aspects and forms of training.

5.3 Main features of general fitness training

Mobility

The first consideration in examining general fitness training is mobility. Mobility is defined as the capacity of joints and joint chains for flexion and extension. In rowing, mobility should be considered in light of an optimum application of force throughout the range of movement used in the rowing stroke. Mobility is examined in section 4.0 of this booklet.

Strength

The second consideration in examining general fitness training is strength. Strength is defined as a muscle or muscle group's ability to develop mechanical force. Strength training is training intended to maintain or increase this ability. Strength is examined in section 5.0 of this booklet.

Endurance

The third consideration of general fitness training is endurance. Endurance is defined as the capacity of the athlete to resist fatigue during applications of work over periods of time. Endurance depends on the maximum aerobic and anaerobic powers and the ability with which they can be utilised. Endurance is examined in section 6.0 of this booklet.

5.4 Mobility

Improvement in mobility enhances the learning of good technique, decreases the risk of injury and provides an opportunity for better development of strength and endurance.

Development of mobility



Active: contraction of muscles, which are naturally related to the movement.



Passive: movement which is effected by an external force



Kinetic: movement which is effected by momentum.

Figure 1 – Types of mobility training

Mobility training is used to maintain or increase the range of joint action. Mobility work should always precede other training and never be practiced in a state of fatigue unless gentle, active mobility is used. There are three types of mobility training: active, passive and kinetic. These are represented in figure 1.

The following order of events should be observed in a mobility training session:

- 1 Raise the general body temperature by light running and general warm-up exercises.
- 2 Active and slow sustained exercises for each joint action – maintains range of movement.
- 3 Passive exercise with partner, apparatus, body weight, etc – increases range of movement.
- 4 Kinetic exercises and combined strength and mobility exercises – relates movement to dynamics of the sport [advanced athletes only].
- 5 Work on specific movements involved in the whole movement exhibited through the stroke cycle.
- 6 Warm down

Factors affecting mobility training

The following are factors that should be considered when planning and implementing mobility training sessions:

- 1 The elasticity of muscles and tendons of the muscles being stretched and of ligaments supporting the joint involved.
- 2 The structural barriers of joint and bone construction, any muscle hypertrophy or any skin and tissue folds which prevent freedom of joint range.
- 3 The strength of the contracting muscle group and the stretch capacity of the opposing muscle group being stretched.
- 4 The degree of coordination through the range of movement.
- 5 The effect of an injury in the muscles or joints involved.
- 6 The internal or external environment.
- 7 The age and sex of the athlete.
- 8 The development level of the athlete.

Mobility exercises

Although there are virtually thousands of mobility exercises to choose from, Appendix A at the end of this booklet, has been provided to assist you at this time. You are encouraged to consult one of the numerous texts that are available.

5.5 Strength

Strength, or the ability to express force, is a basic physical characteristic that determines performance efficiency in sport. Strength may be classified as follows:

Maximum strength

muscle or muscle group's maximum ability to develop mechanical force.

Power

muscle or muscle group's ability to overcome resistance with a high speed of contraction.

Strength endurance

muscle or muscle group's ability to withstand fatigue during applications of work over periods of time.

Development of strength

The development of an athlete in the sport of rowing includes a selection of specific exercises to develop strength relevant to the sport. Although this requirement is necessary, it is important that a proper preparation base is established. This preparation base will be established by the performance of general conditioning exercises.

General conditioning exercises are particularly important at the beginning of the training season and have a greater value for the young athlete than for the mature athlete. These exercises could be introduced through the use of games (such as basketball, football, water polo, etc) or strength training programmes.

Strength training is generally performed by a method of training termed circuit training. Circuit training is a training method in which the various muscle groups are worked in a specific sequence. The effects of circuit training vary and depend on the number and type of exercises, repetitions, sets, rest and mode of training. Therefore, circuit training may be arranged to provide a proper preparation base by general conditioning exercises (for example, by performing exercises with one's body or with a partner) or to develop strength relevant to the sport (for example, by performing exercises with the higher training loads provided by barbells or exercise machines).

Circuit training is called station training when more than one set of exercises for a particular muscle group or groups are performed at a station or another fixed location. Station training then refers to the organisation of training.

Basic principles of circuit training:

- Any available space may be used.
- Special equipment need not be used.
- Many people can train simultaneously.
- The quality of training can be controlled.
- People can train at their own level.
- Weaknesses can be spotted and improved.

A circuit training programme for general conditioning should systematically exercise all parts of the body by choosing many different types of exercises. It should be noted that these exercises may not necessarily relate closely to the desired rowing technique but, as a consequence, they ensure that the athlete does not develop disproportionately.

Adapted from Training av bevegelighet by Eystein Enoksen and Asbjorn Gjerset in the series Treningslaere from the Norwegian Sport Federation.

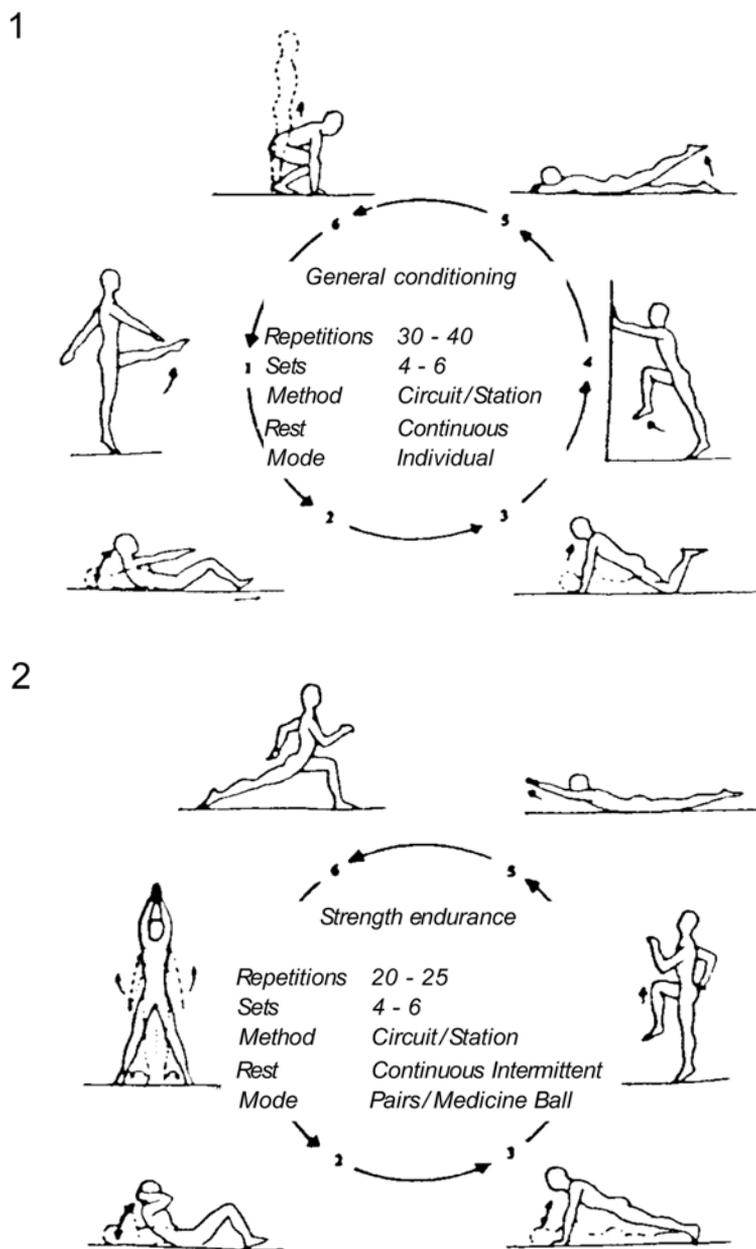
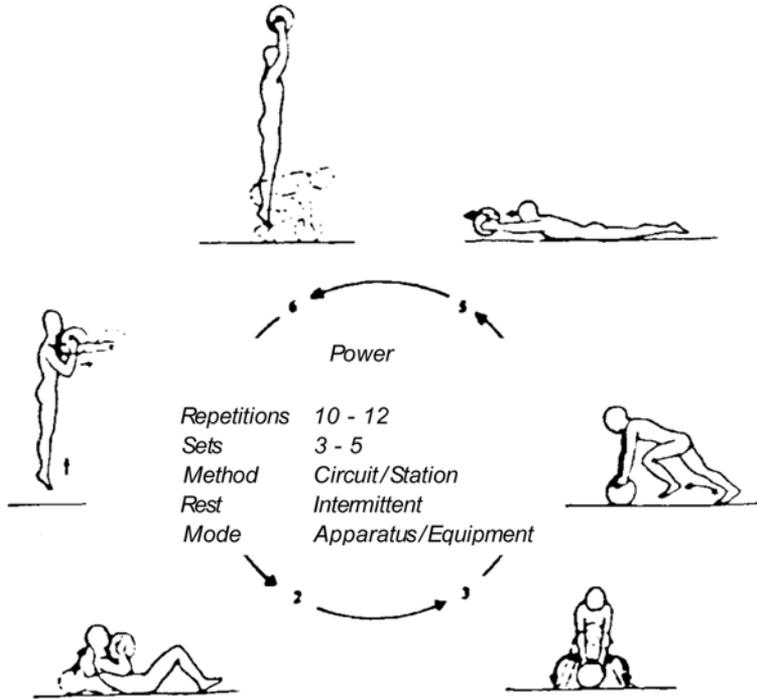


Figure 2.A – Example of circuit training programmes

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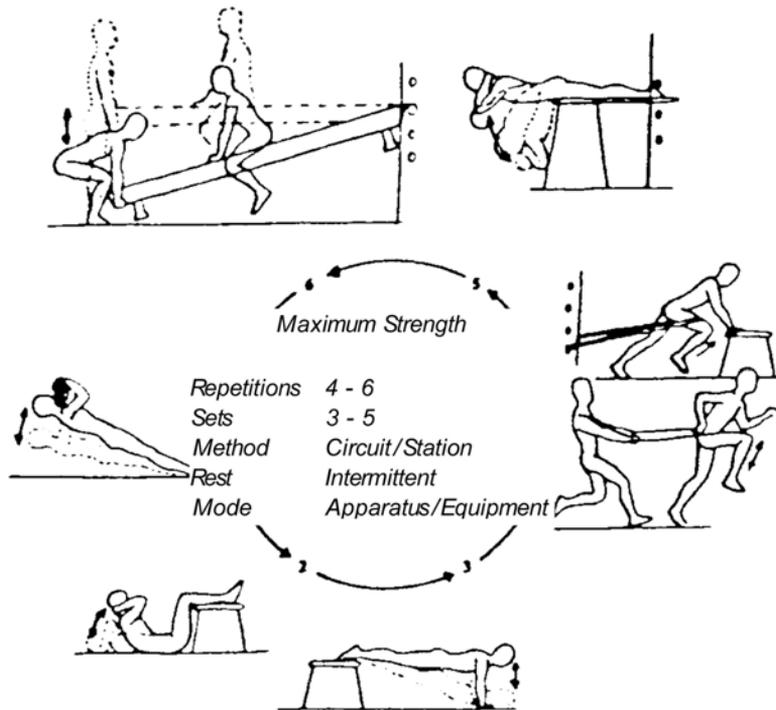


Figure 2.B – Example of circuit training Programmes

The general conditioning programme will establish a broad base of strength on which to build higher levels of strength, particularly strength relevant to the sport. It should be noted that, as the FISA CDP Level I programme is directed to the young or beginner rowing athlete, this booklet will emphasise the utilisation of a general conditioning programme followed by a gradually increasing training load. The establishment of this base will also reduce injuries that may occur during the performance of the more demanding sport-specific exercises.

As the athlete matures and becomes more experienced, the exercises become more specific to the sport and are performed against increasing training loads. This will enable the greatest development of strength relevant to the sport of rowing to occur, particularly strength endurance and power.

This development necessitates the increasing use of apparatus and other devices (barbells, exercise machines, etc) to permit the application of increasing training loads. This is particularly necessary in a circuit training programme designed to improve maximum strength. However, caution should be observed while using this form of strength training.

All strength training should be properly instructed and strictly supervised by the coach or an advisor. The FISA CDP Levels II and III will provide more information about developing strength relevant to the sport of rowing, particularly with the use of increasing training loads provided by the use of barbells and exercise machines.

Factors affecting strength training

The following factors should be considered when planning and implementing strength training programmes:

- 1** It is essential that mobility and general conditioning exercises that use a full range of movement are utilised to ensure normal growth and development, particularly with young or beginner athletes.
- 2** It is inadvisable to increase training loads until a proper preparation base has been established.
- 3** Athletes must be taught the proper technique and be under constant supervision for all exercises using higher training loads.
- 4** Passive or kinetic mobility exercises must never be used when muscles are fatigued.
- 5** Activity should cease whenever sharp pain is experienced in the exercised muscles.

Strength training exercises

In order to assist you in designing your strength training programme, Appendix B, Strength training guidelines, has been provided at the end of this booklet. As well, Appendix C provides further examples of circuit training programmes.

5.6 Endurance

Endurance is the capacity of the athlete to resist fatigue during applications of work over periods of time. The proper development of sport specific endurance results in the achievement of endurance specific to the time period of the sport.

Depending on the time period of the sport, sports requiring a measure of endurance may be classified as either short-term, medium-term or long-term endurance events. This classification divides events into those that occur within 45 seconds to two minutes (short-term), two to eight minutes (medium-term) and over eight minutes (long-term). Generally, a 2,000m rowing event is classified as a medium-term endurance event.

This level of endurance performance requires the specific development of both aerobic and anaerobic capabilities. This development will result in the improved functional efficiency of the cardiovascular, metabolic and nervous systems.

It should be noted that, to optimise the utilisation of this improved functional efficiency, the development must occur in conjunction with the increased strength and the improved technical proficiency of the athlete.

Development of endurance

The development of rowing specific endurance requires improving both the aerobic and the anaerobic energy systems. But, as the aerobic energy system accounts for about 75 to 80 per cent of the energy used during racing (see Basic Rowing Physiology), endurance training must emphasise the aerobic energy system. Endurance training that emphasises the aerobic system will result in improving the transport of oxygen to and the utilisation of oxygen by the muscle tissues.

Factors affecting endurance training

Although endurance training is very important to the proper physiological development of the athlete, it also provides another benefit. This benefit is the opportunity for the athlete to develop the necessary technical proficiency during training.

It will be necessary for the coach to commence the training season with periods of shorter duration and increase the quantity of the work over time for the physiological and technical development of the athlete will require long periods of training. The progressive improvement in endurance capacity and technical proficiency will enable the athlete to perform longer and more demanding periods of quality training as the training season progresses. The FISA Coaching Development Programme Course.

Endurance training methods

Endurance training will usually occupy the greatest portion of the athlete's training programme. Although there are many variables in endurance training, Appendix D, Endurance Training Methods for Rowing, provides a summary for an aerobic training programme for rowing. These methods should be performed primarily on the water but may be adapted to other training modes such as running, swimming, cross-country skiing, cycling and strength training programmes (See Basic Training Methodology).

Although training methods for improving the aerobic and anaerobic energy systems are discussed in the Basic Rowing Physiology booklet, this booklet emphasises the development of the athlete's aerobic capacity. The other methods, particularly in regard to the development of the athlete's anaerobic capacity, will be discussed in Level II of the FISA CDP.

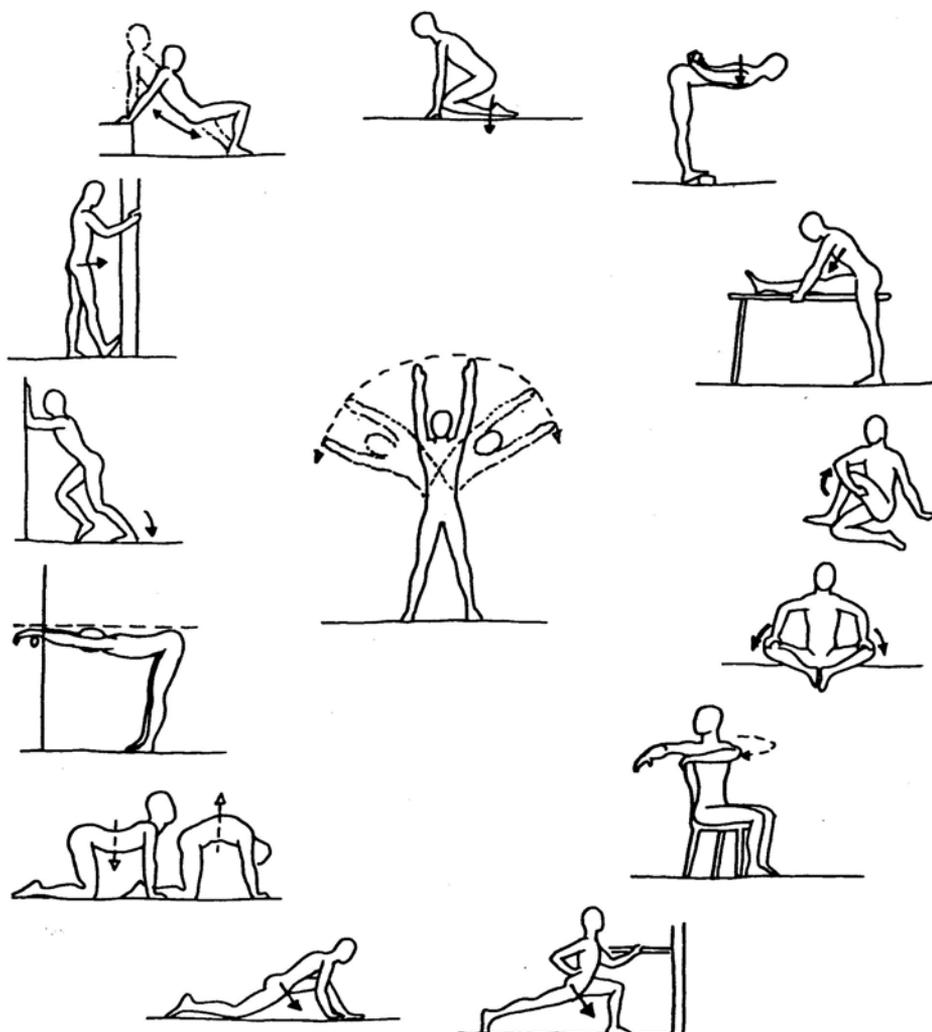
5.7 Summary

The information and suggested training methods presented in the preceding sections are considered basic and of primary importance to young athletes and beginner rowers. It represents the basic physical developmental aspects of good training that will assist this group, in conjunction with improved technical proficiency, to obtain improved benefits from participation in the sport of rowing.

5.8 Appendices

Appendix A – Mobility exercises

In the performance of each exercise, obtain the position indicated in the diagram by stretching the muscles until the initiation of the sensation of pain. Hold the position for about 20 to 30 seconds; increase the stretch and time to 60 to 90 seconds during progressive training sessions.



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Appendix B – Strength training guideline

Type	1	2	3	4
Purpose:	General Conditioning	Strength Endurance	Power	Maximum Strength*
Exercises:	General	General	General	Specific
Legs:	3	3	2	1
Legs & back:	2	2	1	1
Back:	2	1	1	1
Abdominal:	2	1	1	1
Arm flexion:	1	1	1	1
Arm extension:	1	1	1	1
TOTAL:	10-12	8-10	6-8	4-6
Repetitions:	30-40	20-25	10-12	4-6
Sets:	4-6	4-6	3-5	3-5
Method:	Circuit/station	Circuit/station	Circuit/station	Circuit/station
Rest:	Continuous	Continuous/ intermittent	Intermittent	Intermittent
Mode:	Individual	Pairs/ medicine ball	Apparatus/ equipment	Apparatus/ equipment

General Conditioning:

A training program to systematically exercise all parts of the body to provide a broad base of strength on which to build higher level of strength.

Strength Endurance:

A muscle or muscle group's ability to withstand fatigue during extended periods of strength utilisation.

Power:

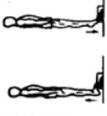
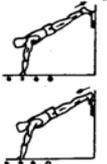
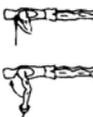
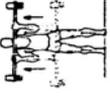
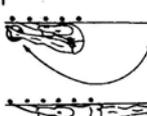
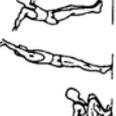
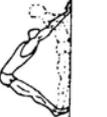
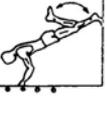
A muscle or muscle group's ability to overcome resistance with a high speed of contraction.

Maximum Strength:

A muscle or muscle group's maximum ability to develop mechanical force.

* = Not recommended for young or beginning athletes.

Appendix C – Circuit training programmes

	GENERAL CONDITIONING	STRENGTH ENDURANCE	POWER	MAXIMUM STRENGTH
LEG MUSCLES				
ARM FLEXOR MUSCLES				
LOW BACK MUSCLES				
ABDOMINAL MUSCLES				
UPPER BACK MUSCLES				
FRONT THIGH MUSCLES				
ARM EXTENSOR MUSCLES				
BACK THIGH MUSCLES				

Appendix D – Endurance training methods for rowing

Energy System	Training Effect	Quantity		Quality		Recovery		
		Number Reps/sets	Duration	Heart rate	Stroke rate	Duration Reps/sets	Heart rate	
Aerobic:	Utilisation							
	1)	1	20-90 min	130-160	20-24	-	-	
	2)	2-3	15-29 min	150-170	22-26	1-3 min	130-140	
	Transportation							
	1)	3-8	3-10 min	180-190	26-32	4-6 min	120-130	
2)	10-20	20-60 sec	185-195	28-34	10-45 sec	120-130		
Training (Examples):								
Utilisation	1)	1 x	45 min	130-160	20-22	-	-	
	2)	2 x	15 min	150-170	22-26	3 min	130-140	
Transportation	1a)	3 x	7 min	180-190	26-28	5 min	120-130	
	1b)	8 x	3 min	180-190	30-32	2-4 min	120-130	
	2a)	2 sets/ 12 min	30 hard/ 10 easy*	185-195	30-32	5-7 min	120-130	
	2b)	2 sets/ 20 min	17 hard/ 5 easy*	185-195	34-36	5-7 min	120-130	

* = stroke