Training Program for
Clubs and Individuals

FISA Development program

rowing

Read this first!

The program is made after requests from Clubs and individual rowers with ambitions to participate in international regattas and Championships. Most rowers are not able to follow the program due to limited time to their disposal, their school or study situation or work and family responsibility – and also less ambitions. The majority of rowers want to have rowing as a healthy and enjoyable free time activity, but the program can still be useful as a guideline for how to plan your own training.

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Thor S. Nilsen
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FISA Development Program

I N D E X:

Editor: Thor S. Nilsen, FISA Development Director - 2009

Introduction:

This “Training Program for Clubs and Individuals” is based on the experience from the “Club Training Program” used by FISA Development Program during the nineties and the first part of the twenty century. Since the Development program was introduced in the middle of the eighties not much has changed in rowing technique and training methodology. The difference is the higher number of hours invested in training by the international elite. With many athletes training up to 36 hours, and more, in a week, injuries in form of stress fractures and lower back problems has occurred more frequently.

Among the lightweight rowers it looks as the immune defence got reduced and common colds, influenza and other fever-related illnesses causes many breaks in the training system. This is probably a result of high training load and reduced intake of food to keep the weight down. Training load and intensity must be managed in balance with nutritional requirement, and it is important that athletes and coaches understand the need of proper control of training volume, intensity and required intake of food.

In this program we have appendixes presenting program for flexibility and series of additional exercises to give the clubs the possibility to create a more “all-round” training program and avoid “disharmony” between the different groups of muscles. Many injuries are related to underdevelopment in non-specific rowing muscles.

The aim of the program:

1. Increase Maximum VO2.
2. Increase Strength Endurance.
3. Increase Maximum Strength.
4. Higher efficiency of Rowing Technique.
5. Better Flexibility and Coordination.

The Program is divided into 6 periods as follows:

Period 1. Preparation period 1: October - January

Period 2. Preparation period 2: January - February

Period 3. Pre-competition period: March - April

Period 4. Competition period 1: May – June - July

Period 5: Competition period 2: August - September
+ Championships "Peak" Program

Period 6: Active recovery and preparation

PERIOD 1: OCTOBER - JANUARY. (PREPARATION PERIOD 1).

Program October:

MAIN EFFECT: Maximum Strength.
Secondary effect: General Endurance.

Program November:

MAIN EFFECT: Maximum Strength and
General Endurance.

PERIOD 2: JANUARY - FEBRUARY. (PREPARATION PERIOD 2).

Program January and February:

MAIN EFFECT: General Endurance and
Muscular Endurance.

PERIOD 3: MARCH - APRIL. (PRE-COMPETITION PERIOD).

Program March and April:

MAIN EFFECT: Basic Specific Endurance
and Rowing Technique.

PERIOD 4: MAY - JUNE - JULY. (COMPETITION PERIOD 1)

Program: Weeks without competition:

MAIN EFFECT: Increased Specific Endurance.

Program: Weeks with competition:

MAIN EFFECT: "Super-Compensation" effect
and Race preparation.

PERIOD 5: AUGUST – SEPTEMBER (COMPETITION PERIOD 2)

"Peek" for Championships or important Regatta

MAIN EFFECT: "Peak" for the Championships.

PERIOD 6: OCTOBER (RECOVERY and PREPARATION PERIOD).

Program September (October)
MAIN EFFECT: Active recovery and preparation.

How to use the Programs?

INTENSITY

The intensity is expressed in "Heart rate" with an indicated "Target Zone", based on percentage of "Maximum Heart rate". Maximum heart rate is estimated as 220 minus age. In the programs 200 HR is used as maximum and 180 HR as minimum. Individual variations will occur frequently.

All training models where HR is indicated show the physiological effect expected, and refer to the Oxygen transport system.

Target Zone:	***Percentage of Max:***	***Training effect:***
130-150	*Up to 75%*	*Utilisation (2)**
140-160	*" " 80%*	*Mainly Utilisation (U1)**
150-170	*" " 85%*	*Anaerobic Threshold (AT)**
170-190	*" " 95%*	*Transportation (T)**
Max.	*" " 100%*	*Anaerobic (A)**

**** = Used in the Training Programs as indication for intensity.***

It is not necessary to stay strict inside the "Target Zone", but to get maximum training effect these rules should be respected:

Training effect:	***Training time in "Target Zone":***
Utilisation:	*80%*
Anaerobic Threshold:	*70%*
Transportation:	*50-70%*
Anaerobic:	*5-10%*

INDICATED STROKE RATE:

The "Stroke rate" is closely connected to the Heart rate, but has its own technical effect. Close to the regatta season, and inside the regatta season, it is important to train in the "Stroke Rate Area" where we are supposed to compete.

The Single-Sculler and the eight will use different "Stroke Rate Areas", and in the program the lowest number is an indication for the slow boats and the highest number for the fast boats. Weather conditions must be taken into consideration with slower rate in head-wind and upstream.

GENERAL INFORMATION:

LIGHTWEIGHT ROWERS:

Lightweight rowers with weight problems should not use the "Volume" or “Maximum strength training”, because it will increase bodyweight and muscle volume. With the "Top-pyramid", maximum strength can be improved without gain of weight.

JUNIOR ROWERS:

Junior rowers should have passed the "Puberty" and have a settled body before they start with heavy weight training. The best period to improve muscle volume and strength seems to be between 18 and 23 years. For younger rowers their own "bodyweight" can be used as load. Circuit training and endurance training is to prefer.

WOMEN:

Women can follow the same training principles as men. Their maximum strength is lower and muscle volume smaller, but their adaptation to endurance is as high as for men. Some scientists insist that women recover faster from heavy endurance load than men do.

Be careful with weight training, and use time to learn a good lifting technique.

TIME REQUIREMENT:

To follow the program completely from October to the end of August, you will need approximately 650 hours of effective training. Total numbers of kilometres on the water are approx. 4.000.

An International elite rower will use between 1000 to 1.500 hours/year and row between 5 and 7.000 Km: *Remember:* Less quantity needs more **QUALITY**.

REDUCTION OF THE PROGRAM:

School- and work problems might reduce the possibility to follow the program, and reduction will be needed. With reduction try to keep the endurance part, and give priority to the boat training.

Training Program for Clubs and Individuals

Months 1: October

Day:	*No*	*Program:*	*Intensity:*	*Km:*
Monday	1	a) Warming up: Running/Gymnastic 30 min b) Weight training (Volume-training*)**) c) Flexibility - Stretching		
Tuesday	1	a) Rowing, running or cycling 90 min b) Core training + Stretching	U2	12-16
	2x)	a) Ergometer 3 x 20 min - rest 4-5 min b) Stretching	U1	
Wednesday	1	a) Warming up: Rowing/running/gymnastic 30 min b) Weight training (Volume training) c) Stretching		
Thursday	1	a) Rowing, running or cycling 90 min b) Stretching	U2	12-16
	2x)	a) Ergometer 4 x 10 min - rest 3-4 min b) Stretching	U1	
Friday	1	a) Warming up: Rowing/running/gymnastic 30 min b) Weight training (Volume training) c) Core training + Stretching		
Saturday	1	a) Rowing, running or cycling 90 min b) Stretching	U2	12-16
	2	a) Warming up: Running/gymnastic 30 minutes b) Circuit training (3 series x 60/60 sec) c) Stretching		
Sunday	1	a) Rowing, running or cycling 120 min b) Stretching	U2	18-22

****) = See program for weight training. **) = Lightweight rowers should use program "Top-pyramid" if weight problems. x) = second training if possible.***

Training Program for Clubs and Individuals

Months 2: November

Day:	*No*	*Program:*	*Intensity:*	*Km:*
Monday	1	a) Warming up: Running/Gymnastic 30 min b) Weight training (Volume-training*)**) c) Flexibility - Stretching		
Tuesday	1	a) Rowing, running or cycling 90 min	U2	12-16
		b) Core training + Stretching		
	2x)	a) Ergometer 4 x 15 min - rest 4-5 min	U1	
		b) Stretching		
Wednesday	1	a) Warming up: Rowing/running/gymnastic 30 min b) Weight training (Volume training) c) Stretching		
Thursday	1	a) Rowing, running or cycling 90 min b) Stretching	U2	12-16
	2x)	a) Ergometer 6 x 6 min - rest 3-4 min b) Stretching	U1	
Friday	1	a) Warming up: Rowing/running/gymnastic 30 min b) Weight training (Volume training) c) Core training + Stretching		
Saturday	1	a) Rowing, running or cycling 90 min b) Stretching	U2	12-16
	2	a) Warming up: Running/gymnastic 30 minutes b) Circuit training (3 series x 60/30 sec) c) Stretching		
Sunday	1	a) Rowing, running or cycling 120 min b) Stretching	U2	18-22

****) = See program for weight training. **) = Lightweight rowers should use program "Top-pyramid" if weight problems. x) = second training if possible***
NB! Use rowing if the weather conditions allow training on water.

Training Program for Clubs and Individuals

Months 3: December

Day:	*No*	*Program:*	*Intensity:*	*Km:*
Monday	1	a) Warming up: Running/Gymnastic 30 min b) Weight training (Maximum strength training*)**) c) Flexibility - Stretching		
Tuesday	1	a) Rowing, running or cycling 90 min b) Core training + Stretching	U2	12-16
	2x)	a) Ergometer 4 x 15 min - rest 4-5 min b) Stretching	U1	
Wednesday	1	a) Warming up: Rowing/running/gymnastic 30 min b) Weight training (Weight endurance training) c) Stretching		
Thursday	1	a) Rowing, running or cycling 90 min b) Stretching	U2	12-16
	2x)	a) Ergometer 6 x 6 min - rest 3-4 min b) Stretching	U1	
Friday	1	a) Warming up: Rowing/running/gymnastic 30 min b) Weight training (Weight endurance training) c) Core training + Stretching		
Saturday	1	a) Rowing, running or cycling 90 min b) Stretching	U2	12-16
	2	a) Warming up: Running/gymnastic 30 minutes b) Circuit training (3 series x 60/30 sec) c) Stretching		
Sunday	1	a) Rowing, running or cycling 120 min b) Stretching	U2	18-22

****) = See program for weight training. **) = Lightweight rowers should use program "Top-pyramid" if weight problems. x) = second training if possible***
NB! Use rowing if the weather conditions allow training on water. If strong winter conditions and snow; use cross-country skiing as endurance training.

Training Program for Clubs and Individuals

Months 4: January

Day:	*No*	*Program:*	*Intensity:*	*Km:*
Monday	1	a) Warming up: Running/Gymnastic 30 min b) Weight training (Maximum strength training*)**) c) Flexibility - Stretching		
Tuesday	1 b)	a) Rowing, running, cycling or cross-country skiing Core training + Stretching	U2	90 min
	2x)	a) Ergometer 4 x 15 min - rest 4-5 min b) Stretching	U1	
Wednesday	1	a) Warming up: Rowing/running/gymnastic 30 min b) Weight training (Weight endurance training) c) Stretching		
Thursday	*1*	a) Rowing, running, cycling or cross-country skiing b) Stretching	U2	90 min
	2x)	a) Ergometer 500 m x 10 rest 1 min b) Stretching	T	
Friday	1	a) Warming up: Rowing/running/gymnastic 30 min b) Weight training (Weight endurance training) c) Core training + Stretching		
Saturday	1	a) Rowing, running, cycling or cross-country skiing b) Stretching	U2	90 min
	2	a) Warming up: Running/gymnastic 30 minutes b) Circuit training (3 series x 90/30 sec) c) Stretching		
Sunday	1	a) Rowing, running, cycling or cross-country skiing b) Stretching	U2	2-3 hours

****) = See program for weight training. **) = Lightweight rowers should use program "Top-pyramid" if weight problems. x) = second training if possible***
NB! Use rowing if the weather conditions allow training on water. If strong winter conditions and snow; use cross-country skiing as endurance training.

Training Program for Clubs and Individuals

Months 5: February

Day:	*No*	*Program:*	*Intensity:*	*Km:*
Monday	1	a) Warming up: Running/Gymnastic 30 min b) Weight training (Maximum strength training*)**) c) Flexibility - Stretching		
Tuesday	1	a) Rowing, running, cycling or cross-country skiing b) Core training + Stretching	U2	90 min
	2x)	a) Ergometer 6 x 5 min - rest 4-5 min b) Stretching	T	
Wednesday	1	a) Warming up: Rowing/running/gymnastic 30 min b) Weight training (Weight endurance training) c) Stretching		
Thursday	1	a) Rowing, running, cycling or cross-country skiing b) Stretching	U2	90 min
	2x)	a) Ergometer 500 m x 12 rest 1 min b) Stretching	T	
Friday	1	a) Warming up: Rowing/running/gymnastic 30 min b) Weight training (Weight endurance training) c) Core training + Stretching		
Saturday	1	a) Rowing, running, cycling or cross-country skiing b) Stretching	U2	90 min
		2a) Warming up: Running/gymnastic 30 minutes b) Circuit training (4 series x 60/30 sec) c) Stretching		
Sunday	1	a) Rowing, running, cycling or cross-country skiing b) Stretching	U2	2-3 hours

****) = See program for weight training. **) = Lightweight rowers should use program "Top-pyramid" if weight problems. x) = second training if possible***
NB! Use rowing if the weather conditions allow training on water. If strong winter conditions and snow; use cross-country skiing as endurance training.

Training Program for Clubs and Individuals

Months 6: March

Day:	*No*	*Program:*	*Intensity:*	*Km:*
Monday	1	a) Warming up: Running/Gymnastic 30 min b) Weight training (Maximum strength training*)**) c) Flexibility - Stretching		
Tuesday	1	a) Rowing 90-120 min b) Core training + Stretching	U2	16-20
Wednesday	1	a) Warming up: Rowing/running/gymnastic 30 min b) Weight training (Weight endurance training) c) Stretching		
Thursday	1	a) Rowing 90 min b) Core training + Stretching	U2	16
	2x)	a) Ergometer 500 m x 10 - rest 1 min (best time possible) b) Stretching	AT/A	
Friday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 4-3-2-1 x 3 (22-24-26-28) – rest 4-5 min c) Stretching	U1	
Saturday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 40/20 x 10 x 2 series – rest 4-5 min c) Stretching	T	16
	2	a) Rowing 90 min b) Core training + Stretching	U2	
Sunday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 4-3-2-1 x 3 (4) (24-26-28-30) rest 4-5 min c) Stretching	U1/U2	16-20

****) = See program for weight training. **) = Lightweight rowers should use program "Top-pyramid" if weight problems. x) = second training if possible***

Training Program for Clubs and Individuals

Months 7: April

Day:	*No*	*Program:*	*Intensity:*	*Km:*
Monday	1	a) Warming up: Rowing 60 min b) Weight training (Maximum strength training*)**) c) Flexibility - Stretching	U2	
Tuesday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 4 x 10 min – rest 4-5 min c) Core training + Stretching	T	16-20
Wednesday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 30/20 x 10 – 2 series - rest 4-5 min c) Core training + Stretching	T/AT	16-18
Thursday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 3-2-2-1 x 3 (24-26-28-32) – rest 4-5 min c) Stretching	Int. 1	16-18
	2x)	a) Ergometer 500 m x 10 - rest 1 min (best time possible) b) Stretching	AT/A	
Friday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 6 x 5 min – rest 4-5 min c) Stretching	T	16-18
Saturday	1	a) Warming up: Rowing 4-5 Km: b) Rowing: 30/15 x 10 x 2 series – rest 4-5 min c) Stretching	T/AT	16-18
	2	a) Rowing 90 min b) Stretching	U2	
Sunday	1	a) Rowing 2 x 12 Km: – rest 25-30 min b) Stretching	U1/ U2	24

****) = See program for weight training. **) = Lightweight rowers should use program "Top-pyramid" if weight problems. x) = second training if possible***

Training Program for Clubs and Individuals

Months 8 a: Mai (weeks without regatta)

Day:	*No*	*Program:*	*Intensity:*	*Km:*
Monday	1	a) Warming up: Rowing 60 min b) Weight training (Maximum strength training*) c) Flexibility - Stretching	U2	
Tuesday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 4 x 7 min – rest 4-5 min c) Core training + Stretching	T	16-20
	2	a) Rowing 60-90 min b) Stretching	U2	14-16
Wednesday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 30/10 x 7 – 3 series - rest 4-5 min c) Core training + Stretching	T/AT	16-18
Thursday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 2-2-2-1 x 3 (26-28-30-32) – rest 4-5 min c) Stretching	T/AT	16-18
	2	a) Rowing 60-90 min b) Stretching	U2	14-16
Friday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 3-2-1-1 x 3 (4)(24-26-28-34) - rest 4 m c) Core training + Stretching	T	16-18
Saturday	1	a) Warming up: Rowing 4-5 Km: b) Rowing: 30/10 x 12 x 2 series – rest 4-5 min c) Stretching	T/AT	16-18
	2	a) Rowing 90 min b) Stretching	U2	
Sunday	1	a) Warming up: Rowing 4-5 Km: b) Rowing: 1000/500/250/250 m x 2 (3) (4-2-1-1 min) (30-32-34-max) c) Stretching	U2 and TI	16

****) = See program for weight training. It is recommended that all rowers use „Top-Pyramid“.***

Training Program for Clubs and Individuals

Months 8 b: Mai (weeks with regatta)

Day:	*No*	*Program:*	*Intensity:*	*Km:*
Saturday	1	a) Rowing: Warming up 4-5 Km: b) Rowing: 3 x 1000 m – rest 15-20 min c) Stretching	T/A	
	2	a) Rowing: Warming up 4-5 Km: b) Rowing: 4 x 500 m – rest 10-12 min c) Stretching	T/A	
Sunday	1	a) Rowing: Warming up 4-5 Km: b) Rowing: 3 x 1000 m – rest 15-20 min c) Recovery rowing 3-5 Km: d) Stretching	T/A U2	
Monday	1	a) Warming up: Rowing 60-90 min b) Stretching	U2	
Tuesday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 3-2-1-1 x 2 (24-26-28-30) – rest 4-5 min c) Stretching	U1/ T	14-16
Wednesday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 1 x 1000 m + 1 x 500 m c) Recovery rowing 3-5 Km: d) Stretching	T/A U2	12-14
	2	a) Rowing “Fartslek” b) Stretching	U2/T	12
		a) Rowing “Fartslek” b) Stretching	U2	12
Friday	1	a) Rowing “Fartslek” b) Stretching	U1	12-14
Saturday	1	Regatta		
Sunday	1	Regatta		

Training Program for Clubs and Individuals

Months 9-10 a: June-July (weeks without regatta)

Day:	*No*	*Program:*	*Intensity:*	*Km:*
Monday	1	a) Warming up: Rowing 60 min b) Weight training (Maximum strength training*) c) Core training + Stretching	U2	
Tuesday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 5(6) x 5 min – rest 4-5 min c) Stretching	T	16-20
	2	a) Rowing 90 min b) Stretching	U2	14-16
Wednesday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 30/10 x 12 – 2 series - rest 4-5 min c) Core training + Stretching	T/AT	16-18
Thursday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 2-2-2-1 x 3 (26-28-30-32) – rest 4-5 min c) Stretching	T/AT	16-18
	2	a) Rowing 90 min b) Stretching	U2	14-16
Friday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 3-2-1-1x3 (4)(24-26-28-36) - rest 4 min c) Core training + Stretching	T	16-18
Saturday	1	a) Warming up: Rowing 4-5 Km: b) Rowing: 17/5 x 15(20) x 2 series – rest 4-5 min (stroke rate 32-34) c) Stretching	T/AT	16-18
	2	a) Rowing 90 min b) Stretching	U2	
Sunday	1	a) Warming up: Rowing 4-5 Km: U1 b) Rowing: 1000/500/250/250 m x 3 (4-2-1-1 min) (26-28-32-max) c) Stretching	U2/ TI	16

****) = See program for weight training. It is recommended that all rowers use „Top-Pyramid“.***

Training Program for Clubs and Individuals

Months 9-10 b: June-July (weeks with regatta)

Day:	*No*	*Program:*	*Intensity:*	*Km:*
Saturday	1	a) Rowing: Warming up 4-5 Km: b) Rowing: 3 x 1000 m – rest 15-20 min c) Stretching	T/A	
	2	a) Rowing: Warming up 4-5 Km: b) Rowing: 4 x 500 m – rest 10-12 min c) Stretching	T/A	
Sunday	1	a) Rowing: Warming up 4-5 Km: b) Rowing: 3 x 1000 m – rest 15-20 min c) Recovery rowing 3-5 Km: d) Stretching	T/A U2	
Monday	1	a) Warming up: Rowing 60-90 min b) Stretching	U2	
Tuesday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 5 min x 2 (26-28) – rest 4-5 min c) Stretching	U1	14-16
Wednesday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 1 x 1000 m + 1 x 500 m c) Recovery rowing 3-5 Km: d) Stretching	T/A U2	12-14
Thursday	1	a) Rowing “Fartslek” b) Stretching	U2/T	12
	2	a) Rowing “Fartslek” b) Stretching	U2	12
Friday	1	a) Rowing “Fartslek” b) Stretching	U1	12-14
Saturday	1	Regatta		
Sunday	1	Regatta		

Training Program for Clubs and Individuals

Months 11-12 a: August-September (weeks without regatta)

Day:	*No*	*Program:*	*Intensity:*	*Km:*
Monday	1	a) Warming up: Rowing 60 min b) Weight training (Maximum strength training*) c) Core training + Stretching	U2	
Tuesday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 4 x 5 min (27-29) – rest 4-5 min c) Stretching	T	16-20
	2	a) Rowing 90 min b) Stretching	U2	14-16
Wednesday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 30/10 x 12 – 2 series - rest 4-5 min c) Core training + Stretching	T/AT	16-18
Thursday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 10 min x 3 (27-29) – rest 4-5 min c) Stretching	T/AT	16-18
	2	a) Rowing 90 min b) Stretching	U2	14-16
Friday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 3-2-1-1x3 (4)(24-26-28-36) - rest 4 min c) Core training + Stretching	T	16-18
Saturday	1	a) Warming up: Rowing 4-5 Km: b) Rowing: 17/5 x 15(20) x 2 series – rest 4-5 min (stroke rate 32-34) c) Stretching	T/AT	16-18
	2	a) Rowing 90 min b) Stretching	U2	
Sunday	1	a) Warming up: Rowing 4-5 Km: b) Rowing: 1000/500/250/250 m x 3 (4-2-1-1 min) (26-28-34-max) c) Stretching	U2 and TI	16

****) = See program for weight training. It is recommended that all rowers use „Top-Pyramid“.***

Training Program for Clubs and Individuals

Months 11-12 b: August-September (weeks with regatta)

Day:	***No***	***Program:***	***Intensity:***	***Km:***
Saturday	1	a) Rowing: Warming up 4-5 Km: b) Rowing: 3 x 1000 m – rest **3-4** min c) Stretching	T/A	
	2	a) Rowing: Warming up 4-5 Km: b) Rowing: 4 x 500 m – rest **2-3** min c) Stretching	T/A	
Sunday	1	a) Rowing: Warming up 4-5 Km: b) Rowing: 3 x 1000 m – rest 15-20 min c) Recovery rowing 3-5 Km: d) Stretching	T/A U2	
Monday	1	a) Warming up: Rowing 60-90 min b) Stretching	U2	
Tuesday	1	a) Warming up: Rowing 60-90 min b) Stretching	U2	14-16
Wednesday	1	a) Warming up: Rowing 4- 5 Km: b) Rowing: 1x1000 m + 1x500 m – rest 15-20 min c) Recovery rowing 3-5 Km: U1 d) Stretching	T/A	12-14
Thursday	1	a) Rowing “Fartslek” b) Stretching	U2/T	12
	2	a) Rowing “Fartslek” b) Stretching	U2	12
Friday	1	a) Rowing “Fartslek” b) Stretching	U1	12-14
Saturday	1	Regatta		
Sunday	1	Regatta		

Training models used in the program

Description, effect and energy-requirement

Group 1: Utilization training

Physiological requirement: Aerobic training with metabolic balance. Energy covered 100% aerobic or with small amount of anaerobic capacity involved, but without accumulated production of acid lactate.

Physiological effect: Increased capillarisation. Increased enzyme activity. Increased number of Mitochondria. *Results:* Increased Oxygen utilisation in the muscle fibres recruited, higher anaerobic threshold and better efficiency of maximum VO2.

Technical effect: Automatization of the rowing movement. Improved technical efficiency.

Model A: LSD "Long Slow Distance" (Utilization)

	Heart rate:	**Stroke rate:**	**Km:**
A) Rowing 90 minutes	130-150	18-22	16-20
B) 10-15 minutes stretching			

Energy-consumption:	*(Max VO2 6 l/min)*	*(Max VO2 5 l/min)*
Calories:	1485	1125
Carbohydrates:	173	131
Fat:	81	62

Total strokes in target-zone: Approximately 1800

Model B: SS "Steady State" (Utilization)

A) Rowing 90 minutes	140-160	22-24	16-20

Energy-consumption:	*(Max VO2 6 l/min)*	*(Max VO2 5 l/min)*
Calories:	1755	1463
Carbohydrates:	265	221
Fat:	67	56

Total strokes in target-zone: Approximately 1980

Group 2: Interval training

Physiological requirement: Training with a relationship of 50/50 to 70/30 of Aerobic/Anaerobic requirement. The accumulated production of acid lactate is low, from 5-7 mmol/l.

Physiological effect: Enlarge and strengthen the heart. Larger stroke-volume. Higher cardiac output.
Results: Increased capacity for oxygen transport.

Technical effect: Improved technique in the area of competition. Training of muscular contraction velocity related to competition.

Model C: "30/10" (Transportation)

30 strokes in specified Target-zone - 10 strokes easy.

	Heart rate:	**Stroke rate:**	**Km:**
A) Warming up: Rowing 20-30 min.	130-160	18-36	4-5
B) "30/10" x 10 rep. 3 series.			
4-5 min. active rest between series.	170-190	33-36	12-14
C) 10-15 minutes stretching			

Energy-consumption: (Max VO2 6 l/min)		*(Max VO2 5 l/min)*
Calories:	1770	1425
Carbohydrates:	322	263
Fat:	42	33

Total number of strokes in Target-zone: ***Approximately: 900***

Model D: "17/5" (Transportation)

17 strokes in specified Target-zone - 5 strokes easy.

A) Warming up: Rowing 20-30 min.	130-160	18-36	4-5
B) "17/5" x 20 rep. 3 series.			
4-5 min. active rest between series.	170-190	34	12-14
C) 10-15 minutes stretching			

Energy-consumption: (Max VO2 6 l/min)		*(Max VO2 5 l/min)*
Calories:	1913	1544
Carbohydrates:	353	289
Fat:	43	33

Total strokes in Target-zone: Approximately 1020

Group 3: Combined training

Physiological requirement: The training will cover both anaerobic and aerobic elements.

Physiological effect: Enlarge and strengthen the heart. Larger stroke-volume. Higher cardiac output. Increased capillarisation, enzyme activity and Mitochondria. *Results:* Increased capacity for oxygen transport, increased utilisation, higher anaerobic threshold and better efficiency of maximum VO2.

Technical effect: Improved Automatization of rowing movement, improved technique in the area of competition, gives the Coach a good possibility to control technique in different rates. Training of muscular contraction velocity related to competition.

Model E: "4-3-2-1" (Automatization and Transportation)

	Heart rate:	**Stroke rate:**	**Km:**
A) Warming up: Rowing 20-30 min.	130-160	18-36	4-5
B) 4-3-2-1 x 4 (24-26-28-32)			
4-5 min. active rest between series.	160-180	24-32	12-14
C) 10-15 minutes stretching			

Energy-consumption:	*(Max VO2 6 l/min)*	*(Max VO2 5 l/min)*
Calories:	1530	1275
Carbohydrates:	238	202
Fat:	56	45

Total number of strokes in Target-zone: ***Approximately: 1040***

Model F: "3-2-1" (Automatization and Transportation)

A) Warming up: Rowing 20-30 min.	130-160	18-36	4-5
B) 3-2-1 x 4 (30-32-36)			
4-5 min. active rest between series.	170-190	30-36	12-14
C) 10-15 minutes stretching			

Energy-consumption:	*(Max VO2 6 l/min)*	*(Max VO2 5 l/min)*
Calories:	1314	1045
Carbohydrates:	221	179
Fat:	40	30

Total strokes in Target-zone: Approximately 770

Group 4a: Special training

Physiological requirement: The training will cover both anaerobic and aerobic elements.

Physiological effect: Recruit all muscle-fibres and empty them for glycogen. Enlarge and strengthen the heart. Larger stroke-volume. Higher cardiac output. Increased capillarisation, enzyme activity and Mitochondria.
Results: Increased capacity for oxygen transport, increased utilisation, higher anaerobic threshold and better efficiency of maximum VO2.

Technical effect: Improved Automatization of rowing movement.
Psychological effect: Keep technique under pressure; improve velocity under high level of fatigue.

Model G: "5-25-30-25-2-2-1" (Automatization and Transportation)

	Heart rate:	**Stroke rate:**	**Km:**
A) Rowing 5-25-30-25-2-2-1 min. *Rowing Non Stop* Rate 20-24-26-28-30-32-36	130-190	22-36	18-20
B) 10-15 minutes stretching			

Energy-consumption:	*(Max VO2 6 l/min)*	*(Max VO2 5 l/min)*
Calories:	1997	1720
Carbohydrates:	366	317
Fat:	46	39

Total number of strokes in Target-zone: ***Approximately: 2270***

Model H: "Race training" (Automatization and Transportation)

A) Warming up: Rowing 20-30 min.	130-160	18-36	4-5
B) 3x2000 m (1000: 30 - 500 m: 32 - 250 m: 34 - 250 m: 36) 15-20 min. active rest between series.	170-190	30-36	10-12
C) 10-15 minutes stretching			

Energy-consumption:	*(Max VO2 6 l/min)*	*(Max VO2 5 l/min)*
Calories:	1499	1174
Carbohydrates:	277	182
Fat:	57	43

Total strokes in Target-zone: Approximately 670

Group 4b: Special training (Combined)

Physiological requirement: The training will cover both aerobic capacity and aerobic power. (Increased VO2 max and higher anaerobic threshold).

Physiological effect: Enlarge and strengthen the heart. Larger stroke-volume. Higher cardiac output. Increased capillarisation, enzyme activity and Mitochondria's.
Results: Increased capacity for oxygen transport, increased utilisation, higher anaerobic threshold and better efficiency of maximum VO2.

Technical effect: Improved Automatization of rowing movement.

Model I a (Day 1): "4x2 min + 4 x 5 min" (Automatization and Transportation)

	Heart rate:	**Stroke rate:**	**Km:**
A) Warming up: Rowing 20-30 min.	130-160	18-32	4-6
B) 4 x 2 minutes (30-30-30-30 s)	160-175	32-30-32-30	1-2
Active rest between series 1 min. Rest between B and C: 4-5 min. easy rowing			
C) 4 x 5 min	140-165	23-25	4-5
Active rest between series 2 min.			
D) 10-15 minutes stretching			

Energy-consumption:	*(Max VO2 6 l/min)*	*(Max VO2 5 l/min)*
Calories:	1640	1520
Carbohydrates:	280	215
Fat:	38	32

Total number of strokes in Target-zone: ***Approximately: 750***

Model I b (Day 2): "LSD" (Automatization and Transportation)

A) Warming up: Rowing 20-30 min.	130-150	20-24	4-5
B) 4 x 10 min. (2500m)	130-150	22-24	10-12
2 min. active rest between series.			
C) 10-15 minutes stretching			

Energy-consumption:	*(Max VO2 6 l/min)*	*(Max VO2 5 l/min)*
Calories:	1500	1180
Carbohydrates:	240	180
Fat:	75	55

Total strokes in Target-zone: Approximately 960

Testing, training control and capacity profile.

Introduction:

In modern sport the elite athletes are regularly laboratory tested to identify the athletes' capacity profile, to follow the physiological development and to control that training programs gives the expected and planned progress.

Testing is a tool for the coach, and a stimuli for the athletes but a qualified laboratory is needed, with experienced technicians and reliable equipment. For normal club activity such testing will be too expensive, but we have many practical and simple tests that can be administrated by the coach or the athlete himself.

We will recommend some classical tests useful to follow the rowers' development during the winter training. Such test can also be used in the regatta season, but performance in regattas itself is the best control of physical and technical development.

To get the best reliable results the tests should be standardized; test at the same time with the same conditions as temperature, altitude, time after meals and the same trainings load the day before or in the morning. Take as well in to consideration if the athlete has had any break in the training due to injuries or illnesses as a cold or other common problem.

ENDURANCE TESTS
the Aerobic Energy System

Harvard Step Test

Description / procedure: The athlete steps up and down on a chair or a platform at a rate of 30 steps per minute for 5 minutes. The athlete immediately sits down on completion of the test, and the total number of heart beats is counted between 1 to 1.5 minutes after finishing. Note: After 2.5 minutes of the test the test person should change rhythm and step up with the other leg first.

Scoring: We recommend using the heartbeat as score for the test. It exist a system of calculation to estimate the total VO2, but the score system is based on the normal population and not for trained athletes. Analysis of the result is by comparing it with the results of previous tests. It is expected that, with appropriate training between each test, the analysis would indicate an improvement

Equipment required: Chair, step or platform 45 cm high, stopwatch, metronome or cadence tape.

Advantages: minimal equipment and costs involved, little time required, and can be self-administered.

Disadvantages: Biomechanical characteristics vary between individuals (e.g. taller people are at an advantage)

Coopers Running Test:

Objective
To monitor the development of the athlete's general endurance.

Required Resources

To undertake this test you will require:
400 meter track - marked every 100 meters
Stop watch
Assistant

How to conduct the test

The test comprises of seeing how far an athlete can run/walk in twelve minutes. The assistant should record the total distance covered to the nearest 100 meters.

Normative data for the Cooper Test

Age	Excellent	Above Average	Average	Below Average	Poor
Male 13-14	>2700m	2400-2700m	2200-2399m	2100-2199m	<2100m
Females 13-14	>2000m	1900-2000m	1600-1899m	1500-1599m	<1500m
Males 15-16	>2800m	2500-2800m	2300-2499m	2200-2299m	<2200m
Females 15-16	>2100m	2000-2100m	1700-1999m	1600-1699m	<1600m
Males 17-20	>3000m	2700-3000m	2500-2699m	2300-2499m	<2300m
Females 17-20	>2300m	2100-2300m	1800-2099m	1700-1799m	<1700m

The following table rates performance for the older athletes.

Age	Excellent	Above Average	Average	Below Average	Poor
Male 20-29	>2800m	2400-2800m	2200-2399m	1600-2199m	<1600m
Females 20-29	>2700m	2200-2700m	1800-2199m	1500-1799m	<1500m
Males 30-39	>2700m	2300-2700m	1900-2299m	1500-1999m	<1500m
Females 30-39	>2500m	2000-2500m	1700-1999m	1400-1699m	<1400m
Males 40-49	>2500m	2100-2500m	1700-2099m	1400-1699m	<1400m
Females 40-49	>2300m	1900-2300m	1500-1899m	1200-1499m	<1200m
Males >50	>2400m	2000-2400m	1600-1999m	1300-1599m	<1300m
Females >50	>2200m	1700-2200m	1400-1699m	100-1399m	<1100m

The following table can be used with experienced senior athletes:

Gender	Excellent	Above Average	Average	Below Average	Poor
Male	>3700m	3400-3700m	3100-3399m	2800-3099m	<2800m
Females	>3000m	2700-3000m	2400-2999m	2100-2399m	>2100m

Another version of the Cooper test is to run 3000 meters on time and a similar table can be used for evaluation. We propose the 12 minutes run that gives the same time-load on each participant.

The Cooper 3000 meters running test can be used to estimate the maximum VO2 after following formula:

- (Distance covered in meters - 504.9) ÷ 44.73

Use Microsoft Excel and set the total meters the athlete has been running, for instance in D3. Choose another cell and set in following formula

- =(D3-504.9)/44.73

Decrease the decimals to none, and you will get an estimated VO2 expressed in ml/kg/min. To get the total VO2 expressed in litre; multiply the athletes' bodyweight with the result in ml/kg/min and dived it with 1000.

Sub maximal Ergometer test:

This test was developed during the nineties under the umbrella of FISA Development program. It was used as a study at the FISA Coaching Academy and has been a useful tool for coaches and rowers as a control instrument for development of training and possible over-training tendencies.

Required Resources

Concept II Ergometer with time, watt and rate monitor.
Heart rate monitor.

How to conduct the test

Warming up: The test starts with 10 minutes warming up. Free rate, but heart-rate should not excide 130 beats. Start the test inside 4 minutes after the warming up process has finished.

Test proceeding:

Each participant works with a specific load as follows:
(Standardize drag factor)
Women: 160 watt
Junior and lightweight men: 210 watt
Heavyweight men: 260 watt

Test time: 5 minutes
Heart rate is taken every 30 seconds from 3.5 minutes to 5 minutes.

After control: After completion of the test the athletes rest on the Ergometer. Heart rate is registered after 1 minute and after 1 minute and 30 seconds.

Score: The average heart rate collected from 3.5 to 5 minutes will be used as score results. (The results can be used for further calculation – see description)
The rest heart rate after 1 minute and 1 minute and 30 seconds should as well be registered as score results.

Evaluation of test results:

The test results (heart rate) can be used for an estimated VO2 calculation:

1. Get the estimate Stroke Volume from table 1.

2. Take the estimated Stroke Volume and multiply with Max heart rate. If the Max heart rate is unknown use 220 minus age as maximum. A 20 years old rower will get 220 minus 20 = 200.

3. The result is maximum blood transported in 1 minute. With ***15 gram*** haemoglobin (per 100 ml blood (normal level for men) the total oxygen transported in one minute will be 20% of total liters.

Example: *Estimated stroke Volume. 150 ml. Max heart rates: 200*
*150 * 200 = 30 liter blood per minute*
*20% Oxygen transported = 30 * 20 / 100 = 6 litre per minute*

4. Use 90% of efficiency for trained seniors. For Senior B and trained Juniors 85%, and for less trained rowers 80%.

Senior *6 litres * 90/100 = 5.4 litre minute*
Junior *6 litres * 85/100 = 5.1 litre minute*
Less trained: *6 litres * 80/100 = 4.8 litre minute*

NB! This is the athletes potential VO2, not necessary what he/she will get in a laboratory test, but most control made has shown the results to be inside 3-4% of real max VO2.

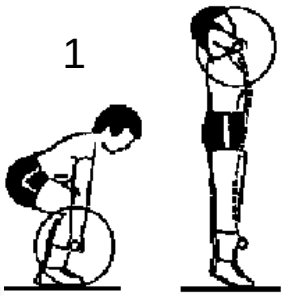
Heart rate	ESV 110 Watt	ESV 160 Watt	ESV 210 Watt	ESV 260 Watt	ESV 315 Watt
100	163	188	233	258	303
105	155	179	221	245	288
110	148	170	211	234	275
115	141	163	202	224	263
120	135	156	194	215	252
125	130	150	186	206	242
130	125	144	179	198	233
135	120	139	172	191	224
140	116	134	166	184	216
145	112	129	160	178	209
150	108	125	155	172	202
155	105	121	150	166	195
160	102	117	145	161	189
165	98	114	141	156	183
170	96	110	137	151	178
175	93	107	133	147	173
180	90	104	129	143	168
185	88	101	126	139	164
190	86	99	122	136	159
195	83	96	119	132	155
200	81	94	116	129	151

Tab. 1

Appendixes:
(weight training)

max strength training

1



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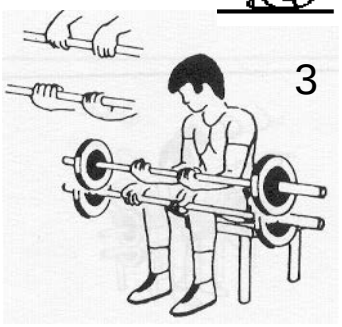

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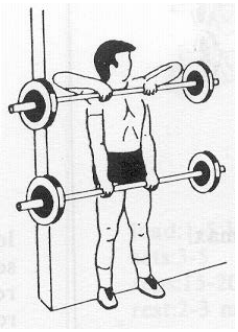

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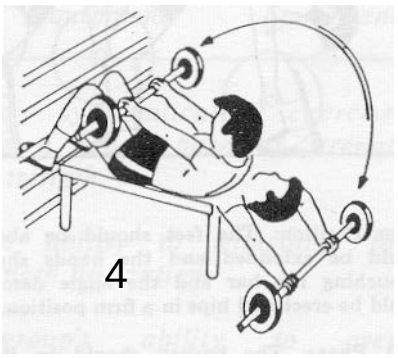

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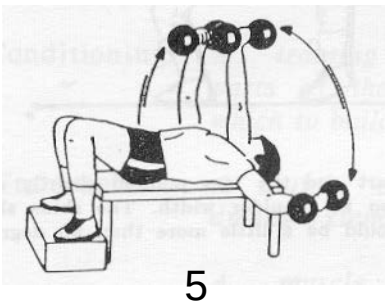

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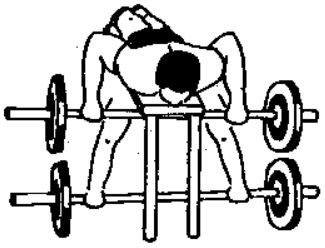

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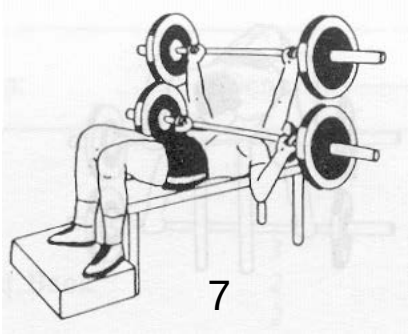
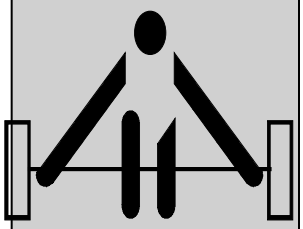


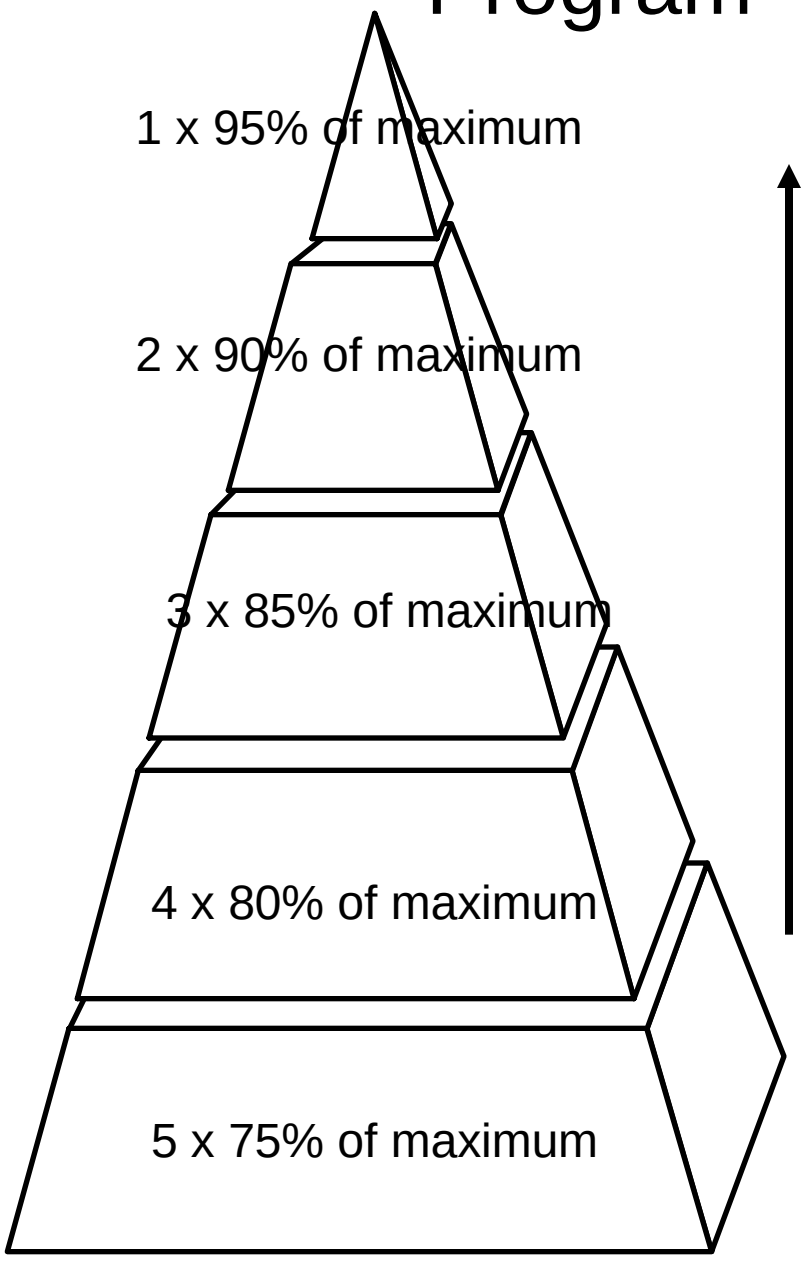
7

Exercises



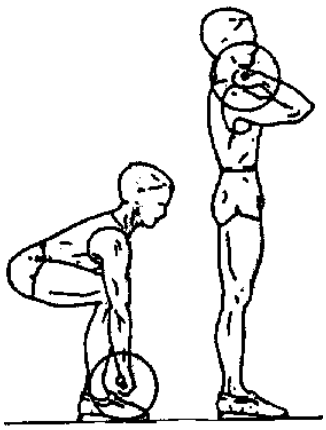
maximum strength

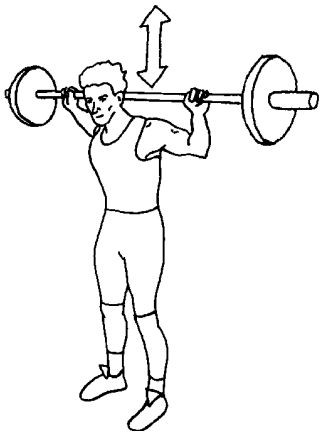
Program



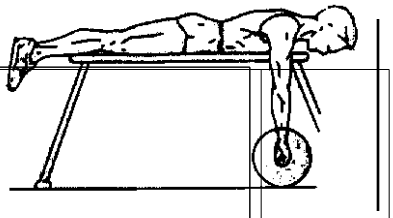
Work two or three together. One work and the others rest and assist to secure the exercise.

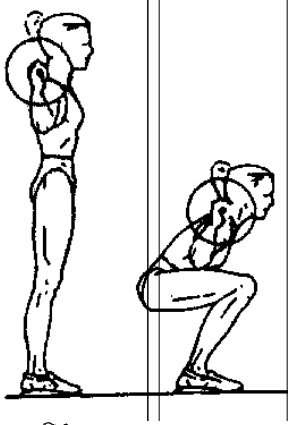
volume training 1

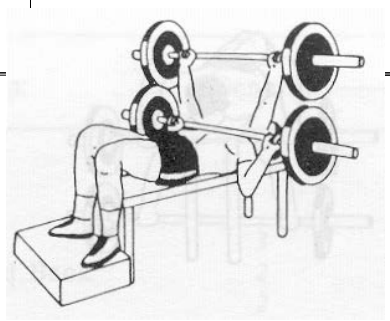


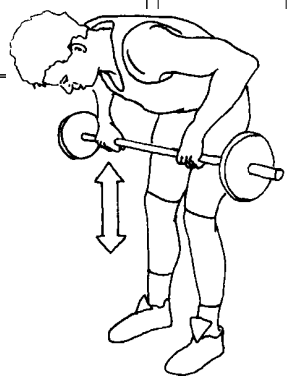


Load: *)
Rep.: 12
Series: 5
*) The weight you can lift 12 times “non-stop”
Rest: (2 work together) one rest – one work



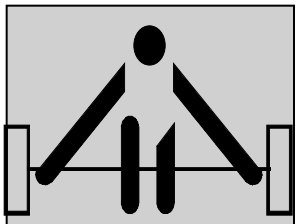




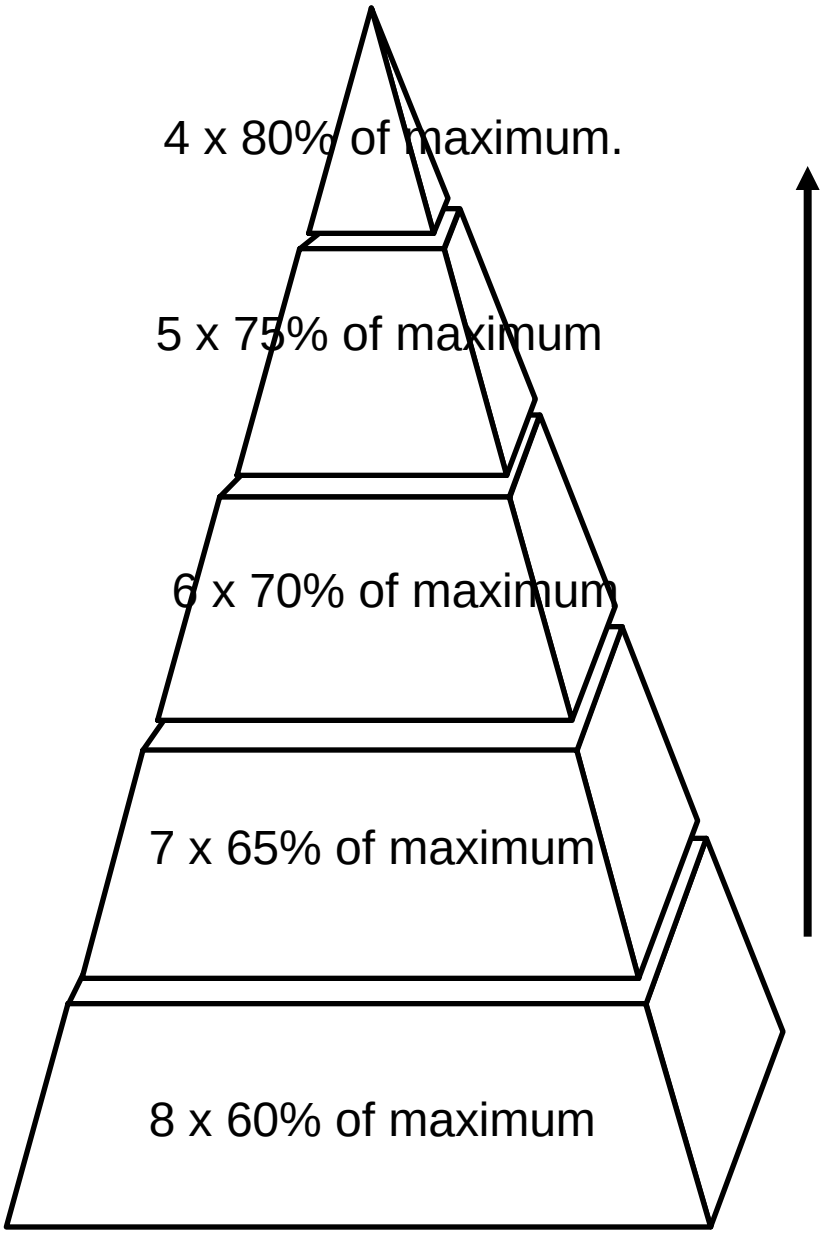


Exercises

(Volume program example 1)



volume training 2

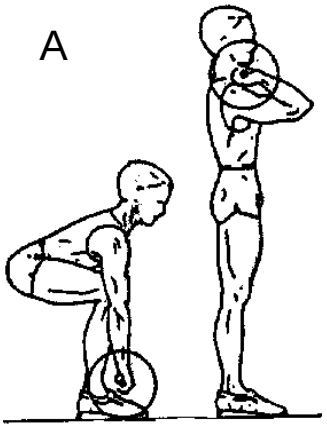


Work two or three together. One work and the others rest and assist to secure the exercise.

(Volume program example 2)

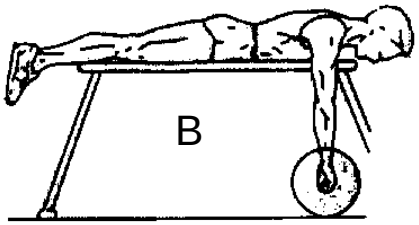
endurance training

A



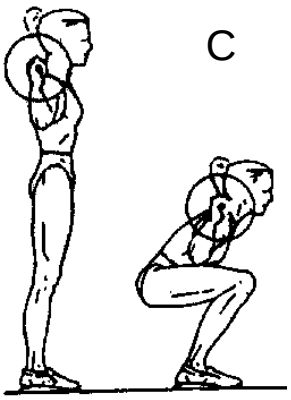
Exercise: A and B

Load:
40-50% of maximum
Series: 2-3
Rep.: 60-80
Rate: 20-26
Rest: 3-4 Min.



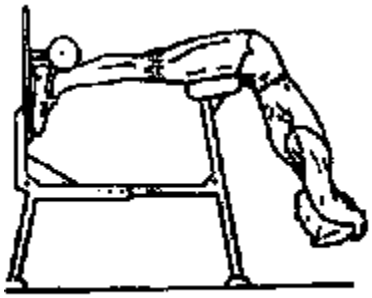
B

C



Exercise: C

Load:
40-45% of maximum
Series: 2-3
Rep.: 60-80
Rate: 20-24
Rest: 3-4 Min.

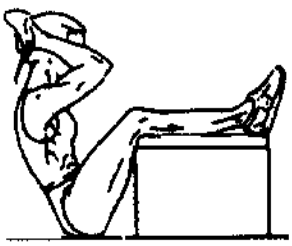


D

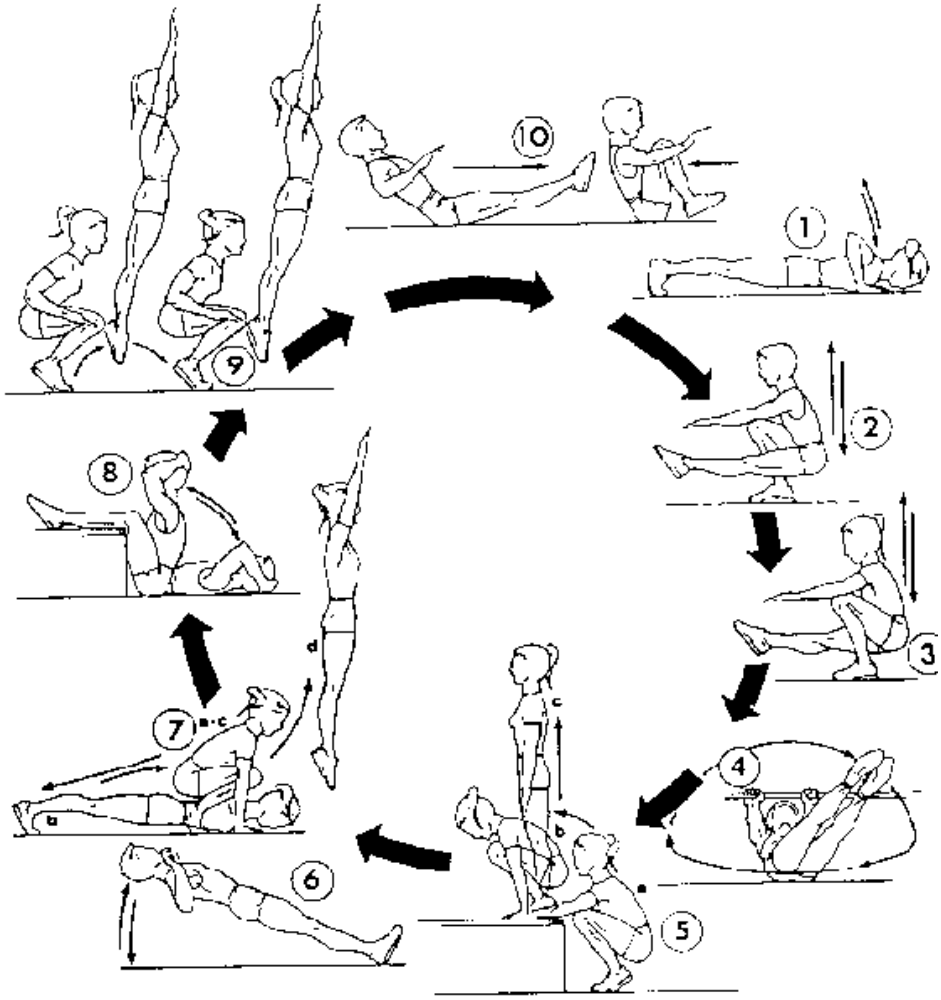
Exercise: D and E

Load:
0-5 kg.
Series: 2-3
Rep.:
D/30-50 E/60-80
Rest: 3-4 Min

E



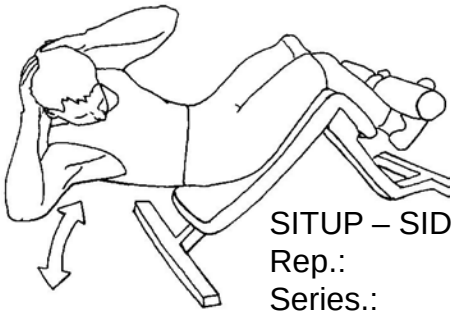
circuit training



Circuit training can be organised as “station “training with a given number repeated at each “station” or with a given time at each station (Ex. 60 seconds work and 30 seconds rest).

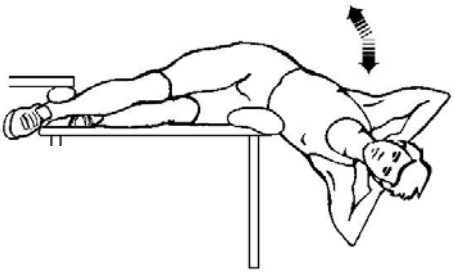
Two and two can also work together and one work and the other rest until the given program is finished.

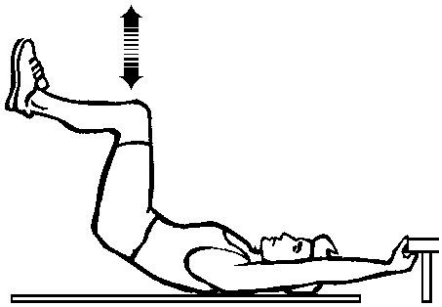
core training



SITUP – SIDE TWIST
Rep.: 15 – each side
Series.: 4

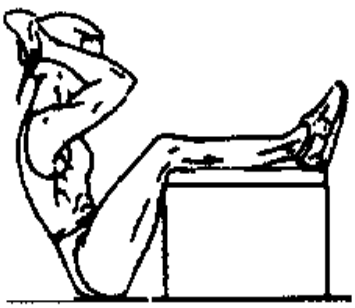
LAYING SIDE TWIST
Rep.: 15 – each side
Series: 4

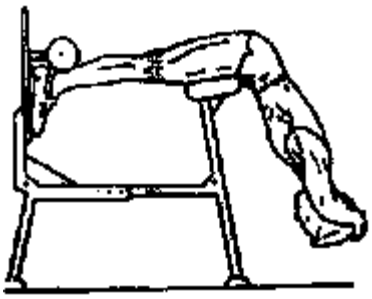




KNEE LIFT
Rep.: 15
Series: 4

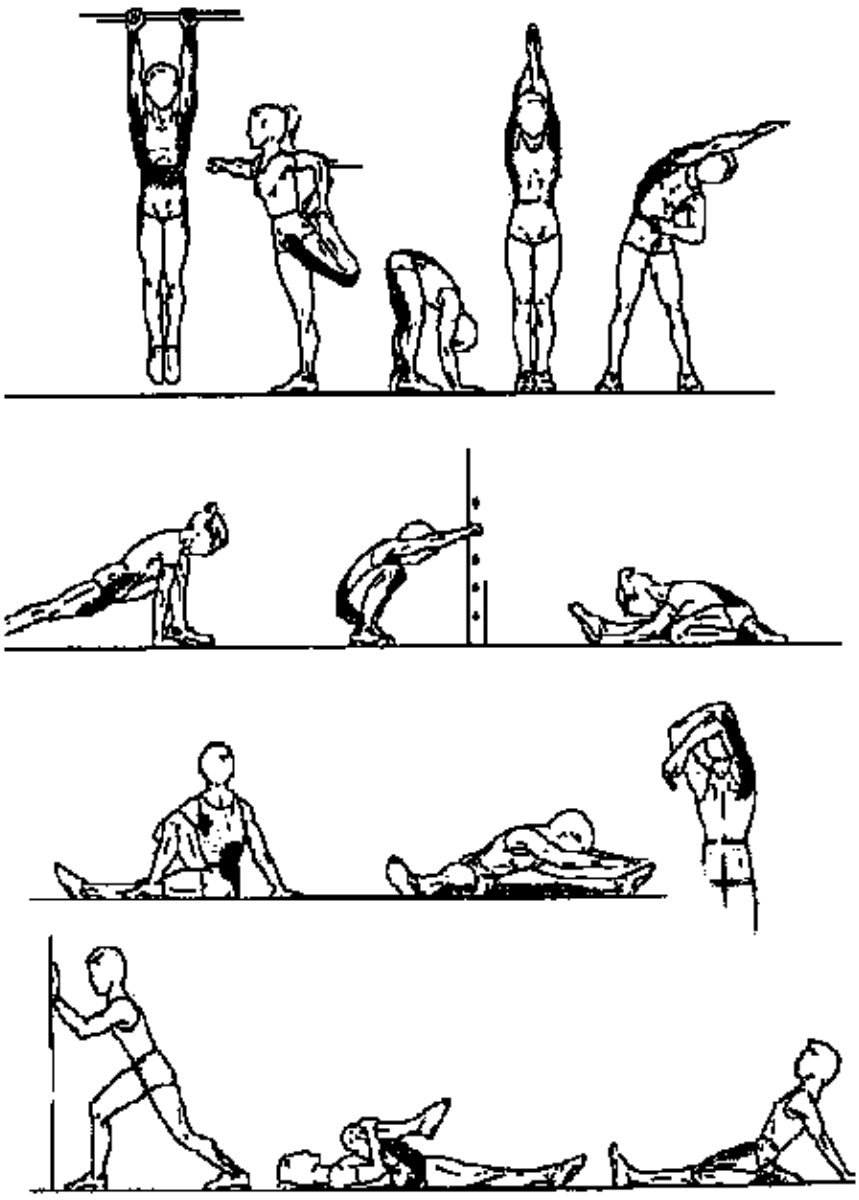
SIT-UPS
Rep.: 20
Series: 4



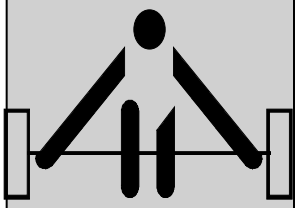


BACK UP-SWING
Rep.: 15
Series: 4

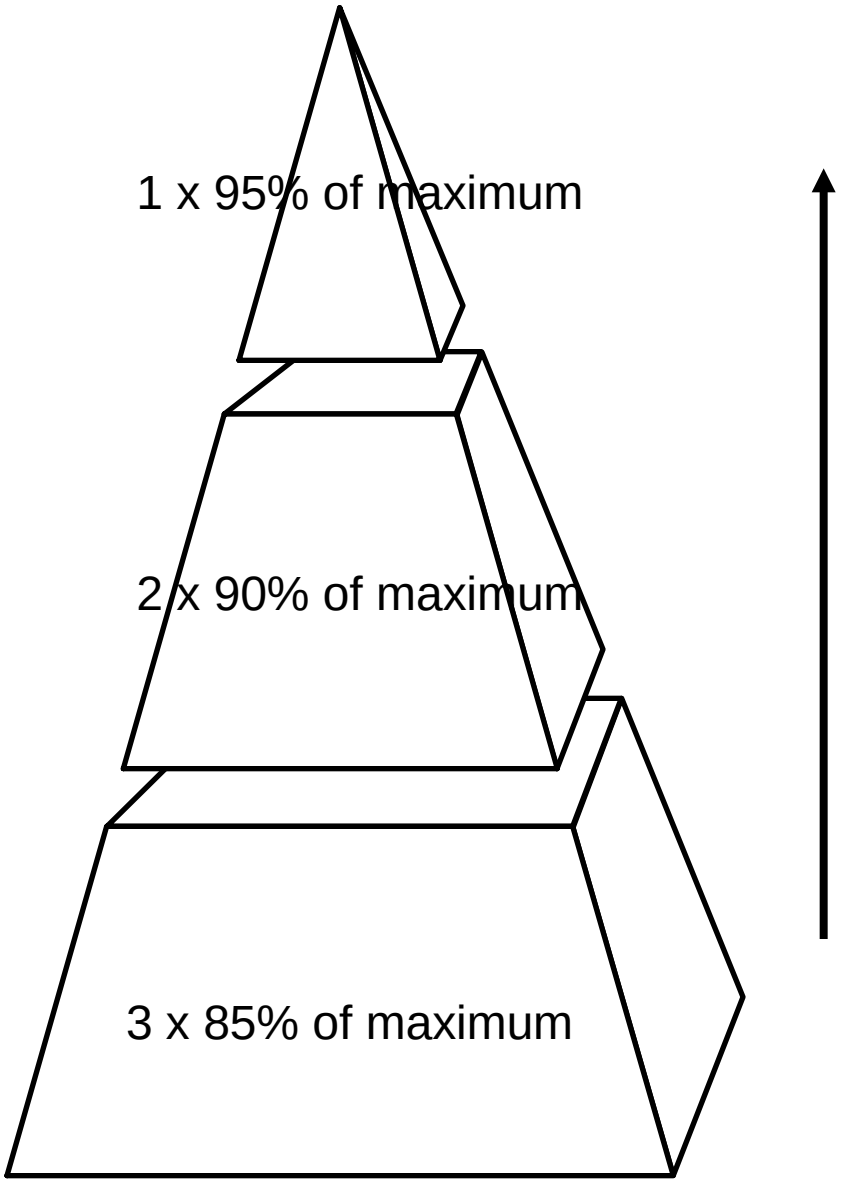
stretching



Example of stretching; take time and do all exercises correct and in “slow motion”.



"top" pyramid training



Work two or three together. One work and the others rest and assist to secure the exercise.