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Programmed Aerobic Intervals and Their Timing

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Interval classes are extremely important in progressive training that helps participants continue to improve and prevent plateauing. However, in the periodized method of training, there are several kinds of intervals and the must come in the sequence in the correct order to have the most benefit and least risk. Intervals themselves must have a structure and be based on the energy systems in order to gain the full benefit of interval training. Interval training combines high and low intensity intervals in a single workout and can

1. train both aerobic and anaerobic systems, by pushing the thresholds to their maximum limits
2. can maximize desired fitness results
3. train both cardiovascular and strength by using strength training during the recovery phase.
4. can maximize caloric burn by alternating brief periods of high intensity work with low intensity recovery periods
5. greatest concentration for increased oxygen and carbon dioxide exchange occurs during the high intensity portions, which causes the body to adapt to uptake more oxygen.

Intervals – Basic Definition:

Interval training incorporates segments of high intensity work with segments of moderate to light intensity recovery periods. This method is effective for training both the aerobic and the anaerobic systems. There is a balance between oxygen available for the body's use, and the intensity of the work being done. As the exercise intensity is increased tot he point that oxygen can no longer meet the demand, anaerobic metabolism contributes to the energy demands.

Basic Benefits:
-Developing anaerobic fitness.
-Higher Caloric Expenditure in the time period.
-Cross training
-Increase in body's ability to utilize oxygen and deliver nutrients to the working muscles
-Builds muscular strength and endurance and helps eliminate soreness
-Pushes beyond steady state.
-Trains cardiovascular and respitory systems
-Helps achieve a higher level of total conditioning.

Note Aquatic Kickboxing is inherently an interval class. It has teaching phases and power phases that don't/can't last longer than 2 min with the repeated powerful kicks and punches. The class then moves back into teaching or recovery before the next sequence. Boxers and kick boxers have 3 min rounds because of the interval nature of the sports

Aerobic/Strength Interval Training - Definition

The work/strength ratio and format for aerobic/strength interval training is variable, but the cardio intensity is maintained throughout. The aerobic intervals stay in the aerobic zone and do not go anaerobic and the strength sections still maintain cardiovascular intensity. After aerobic base building for 4-6 weeks participants need to progress or they will start to plateau. They body will have adapted and started to become efficient at the basic bell curve. We now need to add strength training into the routine for 2 reasons:

1. To build more muscle tissue (not bulk) that has 30 times the metabolism of fate.
2. To challenge the body in a different mode and promote continuing physical fitness development and weight loss if that is desired goal.

You have 2 basic options for the set up for this type of class.

1. Circuit class - repeating exercises and muscle group work through a series of stations (stanchions) with the following variations

a. format of muscular strengthening alternating with cardiovascular conditioning either S/CV/S/CV or S/S/CV/S/S/CV. Good for the beginning of the strength-training period of training.

b. longer to transitions between stations, allow participant at least 2 minutes at each station. This will be Strength/Cardio only with each person doing both parts each station so the timing can be different. Later in the strength training month

c. each station is performed at maximal effort in a short period of time. This will be Strength/Cardio only with each person doing both parts each station so the timing can be different. End of the strength training period/month.

The circuit class offers a format alternating between muscular strengthening with cardiovascular conditioning. Depending upon the size of the pool, a number of stations are set up which alternate between aerobic training and muscular strengthening.

The circuits can also include on-deck exercises performed on a mat, followed by exercises done in the water. However, there must be a safe exit for all the participants (stairs or ramps). Ladders may be a problem for some participants and pushing up and out of the pool is not recommended. The circuit should be set up so the participants can easily transition from one station to another.

Equipment is not necessarily needed for each station; however, if it is used, the equipment should be easy to pick up, put down, or strap on. Instead of getting an efficient work out: having a large variety of equipment may make the participant frustrated and waste time trying to put on the equipment.

Because it takes longer to get to each station and longer to set up, participants should spend more time at each station. In contrast to a land circuit routine, which would

typically allow 10 – 20 seconds at each station, the water circuit should allow 2 full minutes at each station. Also at least 2 rounds of a circuit should be done to actually overload and train the tissue that means only 9-11 stations may be possible including the aerobic stations. They need to be planned out to maintain muscle balance and aerobic intensity.

Stanchions, posters, or laminated cards should be set up in the sequencing order around the pool. The signs will have the exercise printed on them; however, pictures are very beneficial.

2. Interval/Circuit - Each participant has a set of equipment, vs. the equipment being set up around the pool. The class is completely instructor led and the instructor designates the length of time for the interval/equipment, and the instructor would change the muscle groups worked, assuring an even balance between agonist and antagonist. This format can be varied to progress throughout the entire 4-6 weeks of strength training.

During the active recovery stage of interval/circuit training, muscular conditioning, which promotes strength and endurance, is replacing the low intensity aerobics, thus utilizing the interval/circuit format. This training is also a variation of circuit training: the entire class follows but does not transition station to station around the pool. Each participant would have a set of equipment; hand belles, kick boards, dyna-bands, etc. The instructor designates the length of time for the intervals; however, the format would alternate between aerobic exercise and muscle conditioning. The instructor would change the muscle groups worked, assuring an even balance between agonist and antagonist muscles.

Types of Interval/Circuit Classes

a. Cardio. Strength
    i. Uses a ration 3:1.5 ration, three min. of higher cardio with 1.5 min of strength training
b. Spilt
    i. Uses the same ration for both cardio and strength
c. Ring Circus
    i. Uses a high intensity cardio segments followed by a moderate cardio and then strength training.
    ii. This is a 1:2 ratio
    iii. It can be divided into different segments or the whole class can do the intervals together.

Class format

Thermal warm-up + rehearsal moves/demo stations or exercises + active stretches (10 min)
Choice of circuit or interval/circuit program (40 min)
Cool-down aerobics (5 min) Static Stretching (5 min)

Variables

a. Intensity of work interval
b. Duration of work
c. Duration of recovery
d. Number of Repetitions
e. Circuit or Interval/Circuit Setup

Aerobic Interval Training - Definition

The work/recovery ratio for aerobic interval training is measured. The harder the high intensity interval the longer it takes for the aerobic system to utilize the lactic acid and reform the ATP. There are several important aspects to good aerobic/anaerobic energy training

First the timing and repetition of the cycles is the key to effective interval training. Intervals that are more like Fartlek intervals.
(Farlek Intervals

i. Uses their needs and perceptions to determine the length and speed of each interval
ii. Does not involve accurately measured intervals
iii. The recovery sections are moderate cardio not strength training.)

or random intervals are still a calorie burn and good cardio training, but do not allow the body to progressively overload and adapt to become more efficient at recovery and oxygen uptake. When we are approximating the heart rate charts and intensity level remember the following conversions to perceived exertion.

Percent of Maximum Heart Rate	Perception or Ability to Perform
65	Lower end of the aerobic zone. Should feel like an 5 and can be maintained for 30-50 min.
85	Upper end of the aerobic zone. Should feel like an 8 and can be maintained for 3-5 min, but is a strong push.
87.5	Just over the anaerobic threshold. The lactic acid system is being called into use and it can be maintained for 2 min but then the body (not the mind) either slows down or the breathing becomes irregular.
90	The lactic acid system is contribution significantly to the exercise and it can be maintained for 1 min but then the body (not the mind) either slows down or the breathing becomes irregular.
92.5	The phosphagen system is starting to come into play. The body can maintain the activity for 30 sec but then the body (not the mind) either slows down or the breathing becomes irregular.

95	The phosphagen system is fully engaged and adding to the other 2 energy systems. The body can maintain the activity for 20 sec but then the body (not the mind) either slows down or the breathing becomes irregular.

The amount of recovery for each of these levels is extremely important. The ADP must be converted back into ATP and the Lactic Acid reutilized before the next interval. You want to be able to perform the next interval with the same amount of power as the first, but not give so much rest that the body is not being pushed to adapt. Use the following Chart for timing ratio compared to intensity ratios.

Time at High/Time at Low	Intensity at High / Intensity at low
3Min/1Min	85/65
2min/1 min	87.5/65
1min/1 min	90/65
30 sec/1 min	92.5/65
20 sec/3 min	95/65

Points to remember are
1. The work/recovery ratio must stay consistent. Beginners should keep their work intensity at 60-70%. Extremely fit participants may reach 90-95% maximum. The cycles should be repeated in order to reap the benefits of I.T. training; however, the number of cycles in a workout is dependent on exercise goals and fitness levels. A complete class in I.T. training would have cycles repeated 3-5 times of the 85, 87.5 and 90 percent of maximum heart rate intervals and 5-10 times for the 92.5 and 95 percent maximum heart rate intervals.

2.During recovery periods, do not let the heart rate drop below 60% age-predicted maximum heart rate. This level maintains blood perfusion through the heart and liver to allow removal of lactic acid.

3. Participants should not perform any intervals unless they have just complete 4-6 weeks of aerobic base building (bell curve) and preferably 4-6 weeks of strength and aerobics (interval/circuit) to be able to properly perform the anaerobic intervals and reduce the risk of injury.

Conclusion – After aerobic base building interval/circuit provides the next progression in periodization. Then anaerobic interval training can be performed which if followed by 1-2 weeks recovery or games. Then start the sequence over again with aerobic base building. Each time through the cycle, participants improve their fitness levels and never plateau. Also, changing the mode of training minimizes overuse injuries

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1. Why can interval classes be important?

2. What can interval classes do for a single workout (list 5)?

3. What is the Basic definition of intervals?

4. List 8 Benefits of interval training?

5. T or F Aquatic Kickboxing can be interval but doesn't have to be.

6. What is the Aerobic/Strength Interval Training Definition?

7. How long do participants need to be in aerobic base building before attempting intervals?

8. In the ideal programming, what should follow aerobic base building?

9. Why do we need to add strength training to our programming? (2 reasons)

10. What are your 2 basic options for strength training?

11. List the 3 basic variations for circuit classes?

12.T or F you can add deck stations to a circuit anywhere for greater intensity.

13.What are the considerations and reason behind them when adding equipment to a station?

14. How long are traditional land circuit stations?

15. How long are water circuit stations in general?

16. For 2 min stations how many stations should you plan for in a 1-hour class?

17. How can you help to identify stations and keep the class moving?

18. What is an interval/circuit class?

19. List and explain 3 types of interval/circuit classes.

20. What are the 5 variables you can change in a circuit or interval/circuit class?

21. What is the definition of aerobic interval training?

22. What are the important aspects of aerobic interval training?

23.What is Fartlek training?

24. Recreate the Percent Maximum Heart Rate versus perception table.

25.What is the duration for each of level in interval training and its recovery?
85/65
87.5/65
90/65
92.5/65
95/65

26. How many cycles of 85, 87.5 and 90 percent intervals should you perform?

27. How many cycles of 92.5 and 95 percent intervals should you perform?

28. Why shouldn't the heart rate drop below 60%?

29. When can participants perform aerobic intervals?

30. What is the order of the periodized programming and the approximate number of weeks in each?

31. Why do we want to do periodized training?