



Rowing has long been recognized as the perfect aerobic exercise; Smooth, non-load bearing, rhythmic, whole body and low impact. It is ideal for any user regardless of age, sex, or physical condition.

“Rowing, indoors or outdoors, at any exercise level of intensity, requires a greater exercise expenditure than any other aerobic activity. Calories are burned in relation to the number of muscles used and the intensity and duration of the exercise. Rowing with a sliding seat uses a very large muscle mass since the upper, lower and trunk muscles are used vigorously” Dr. C Everett Koop- Former US Surgeon General

### **The Nature of Rowing - Introduction**

The exercise of rowing relates to the work done by an oarsperson to move a boat through the water. An increase in effort by the oarsperson will result in a faster boat. As the speed increases so does the drag acting on the boat, this requires the oarsperson to work harder in order to maintain boat speed. This effort by the oarsperson is achieved by recruiting all major muscle groups sequentially to form a continuous even stroke. When rowing, the connection between the oarsperson and the moving water is an immersed paddle, this natural fluid connection results in a smooth, low impact form of exercise.

The nature of rowing is pleasurable - a past-time which invigorates the body while relaxing the mind.

Too often, this relaxation element is missing on conventional mechanical rowing machines.

### **Naturally Self Paced**

Contrary to popular opinion, rowing - like other forms of aerobic exercise - is not a resistance based exercise. You do not change resistance when you run, swim, cycle or cross-country ski - you can't.

Rowing and aerobic based exercise is about intensity. You work at your desired intensity and you and your equipment move at a speed which is equal to the intensity of work being done. If you increase your intensity you go faster. The limit to your intensity is you, your physiology, your ability to reach and maintain a level of work. This is the naturally self paced nature of rowing and aerobic sport.

When rowing, the boat does not impose a resistance on you, you impose the work on the boat. If you increase your work the boat will move faster. The limit to how fast the boat will move is you, your physiology, your ability to reach and maintain a level of work.

Ultimately, the more you put in to it, the more you'll get out of it.

### **Natural Drag Effect**

When an oarsperson rows, the work they do is absorbed by the drag of the boat moving through the water. The more intensively they work, the more drag they overcome and the faster the boat will move.

This self paced effect allows the oarsperson to work at any intensity. The boat simply responds, moving at a speed which is equal to the intensity of work being done.

As boat speed and momentum increase, it does not get easier to row. As the speed increases, the drag acting on the boat also increases, requiring the oarsperson to work more intensively in order to maintain speed.

What you put in is what you get out.

### **Natural Fluid Connection**

When rowing, the connection between the oarsperson and the moving water is simply an immersed paddle. As a result, rowing is smooth and low impact, ideal for any user, young or old, male or female, fit or unfit.

## **WaterRower**

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The oar does not tear through the water. The oar locks into the water and the oarsperson simply levers the mass of the boat and crew past this lock point. Any tearing or slipping through the water is wasted energy since it does not propel the boat forward.

The natural fluid connection of the WaterRower's paddle in water acts to dampen out the harsh mechanical feel typical of conventional mechanical rowing machines.

### **Naturally Even Stroke**

When rowing, the oarsperson does not work to overcome a resistance which would typically fade as it is overcome. They work to accelerate the mass of the boat and crew. This mass does not change through the stroke, it is the same from beginning to end.

This provides for a naturally even stroke and allows the oarsperson to recruit all three major muscle groups to contribute to the propulsion of the boat.

The three major muscle groups - the legs, torso and arms - are recruited sequentially and in proportion to their strength, generating a uniform aerobic load and optimizing the exercise benefit.

Rowing is a continuous, even stroke there is no start or finish, the motion of the handle replicates the motion of a bicycle chain, there is no stopping at any point.

### **Natural Full Body Fitness**

Rowing, unlike other popular aerobic exercises such as running and cycling, is a full bodied exercise which recruits all major muscle groups.

The oarsperson is connected to the boat through the toes and the ends of the fingers. The rowing action requires that all the muscle groups between these two contact points contribute to the propulsion of the boat and should do so in proportion to their individual strength. This lessens the risk of overloading any particular muscle group.

By recruiting such a large mass of muscle, rowing is unequalled in terms of efficiency and calorie consumption. Even amongst other whole bodied aerobic pursuits like swimming and cross country skiing, rowing is unique in that by transmitting the work through the whole body it recruits all major muscle groups simultaneously. Swimming and cross country skiing use the major muscle groups independently.

Rowing requires that the work of the dynamic muscle groups (arms and legs) be transferred through the static muscle group of the torso. This helps to strengthen core stability muscles which further improves posture. As a result, and contrary to common opinion, rowing can assist in chronic back problems.

### **History of Rowing**

Rowing began with the Egyptians and was soon adopted by the Greeks, Romans and the Vikings. Modern day rowing grew from the competitive instincts of the watermen who would ferry pilots to incoming ships, so that they could navigate the ships into harbor. The first pilot to reach the ship would get the job, so speed became an essential component.

As the competitive exploits of these early watermen grew, so did the the sport of professional rowing. The Doggett's Coat and Badge race for competitive Watermen has taken place every August 1st since 1716 over four and a half miles of the River Thames in London, England.

In the 1800's it was thought that the oars people who earned their living doing manual work (even if not rowing related) held an unfair advantage over the relatively idle gentry of the upper classes and the organization of the sport broke in two; professional (for manual workers) and amateur. Competitive rowing as we know it today has its roots in amateur rowing and, until only relatively recently, manual workers were excluded from competition.

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The quest for speed has seen many developments in the rowing boat, one of the most important being the introduction of the sliding seat in the 1870s. This allowed more force to be applied to the oar through greater use of the legs in co-ordination with the back and arms.

Over the centuries, as rowing has developed, many differing classes of boats have evolved. These classes may be separated into two broad categories: sculling boats, in which the oarsperson uses two oars (one in each hand), and rowing boats (or sweep boats) where each oarsperson uses one oar.

Sculling boats come in one, two and four person configurations (though some juniors do train in eight person Octuples). Rowing boats are available with or without coxswain (the steersperson who steers the boat, directs and motivates the crew). Coxed rowing boats come in two, four and eight person configurations while coxless rowing boats come in two and four person configurations.

Another variant which has recently received Olympic representation is lightweight rowing. This limits the average crew weight and the maximum weight for any individual crew member. Some may be surprised but, even at international levels, lightweight crews are very competitive against the open weight classes, shattering the myth that you have to be big and burly to be a competitive oarsperson.

Indeed, the beauty of rowing is that anyone can do it, regardless of age, weight, sex and physical condition. It's just that the fitter you are, the faster you'll go.

### **Rowing and The WaterRower**

Ask most fitness equipment users to work harder and they'll immediately reach for the knob or button designed to increase resistance. But naturally performed aerobic exercises don't have knobs to turn or a button to push, so how do you change resistance when you are swimming, running, cycling or cross country skiing? You don't. If you want to increase your intensity, you simply swim, run, cycle or ski harder.

The WaterRower's patented WaterFlywheel has been designed to replicate the natural dynamics of rowing. To increase intensity, you simply row harder.

Conventional rowing machines require the user to overcome a resistance, which typically fades as it is overcome. The beginning of the stroke is often heavy and the finish light. This makes it difficult for the user to load the muscle groups evenly and often results in over fatigue in one muscle group (usually the legs, dependent on the users technique and physique).

### **WaterRower's WaterFlywheel**

The WaterRower's patented WaterFlywheel design emulates the fixed mass characteristic of rowing. The volume of the water in the tank represents the mass of the boat and crew, and is the same from beginning to end. You may alter the water level in the tank but this does not change the resistance - it changes the drag effect. More water simply requires the user to maintain the momentum of a greater mass, much like being in a heavier class of boat.

When rowing, the connection between the oarsperson and the water is fluid, a paddle in moving water. Conventional rowing machines are, by contrast, harsh and mechanical, generating a jerky, jarring action which is unlike rowing. The WaterRower's patented WaterFlywheel design emulates the fluid connection making it the smoothest and quietest rowing machine available.

### **Training for Rowing**

As with many aerobic based sports, the majority of training for rowing is done at quite moderate levels of intensity (about 60 to 70% of maximum heart rate) over prolonged periods of time, allowing the oarsperson to exercise for long durations with little accumulated fatigue.

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Training within these levels allows the rower to realize the durations of exercise necessary to improve cardiovascular efficiency/fitness and also technique.

Training for rowing does not require a consistent all-out effort. If the intensity of the exercise is increased, the oarsperson will fatigue more quickly. Technique will also deteriorate, increasing the risk of injury. As a result, the higher the intensity in rowing, the shorter the duration of time involved.

In summary, the principle of training for rowing is two part; physiological training and technical training. If it hurts - you're doing it wrong.

### **Competitive Rowing**

Competitive rowing takes many forms. The most competitive form is Olympic class rowing which takes place over a 2000 meter course and consists of competitors racing in one of six marked (buoyed) lanes. The duration of the race will vary in length depending on the class of boat and the ability of the crew. The fastest boat is the Men's Eight which, at Olympic levels, can complete 2000m in about 5 minutes 30 seconds, whereas a Men's Single Scull would complete the same course in about 6 minutes 40 seconds.

This duration of exercise divides the rowing race into portions of explosive unsustainable work and consistent sustainable work.

The beginning of the race requires an explosive use of speed to accelerate the boat away from the start and to establish a position. Physiologically this explosive power is derived anaerobically (causing fatigue through lactic acid build up) and cannot be sustained for more than a minute or so.

At this stage the oarsperson must reduce intensity to achieve a sustainable level of work. Physiologically this sustainable power is derived aerobically (produced through the intake of oxygen) and can be sustained almost indefinitely. At the end of the race the rower will "go for the line" and increase intensity above sustainable levels in the hope that they finish first!

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