

Aquatic Equipment: Body and Program Benefits

By: June M. Chewning, MA

Aquatic equipment is growing in popularity, function, and design. In the past ten years the aquatic equipment industry has exploded with well designed, beneficial options for use in group fitness, personal training, and rehabilitation applications for health-fitness fitness professionals. Including aquatic equipment in your programs serves many purposes including:

- Using equipment to create overload beyond the water's resistance. Just as gravity creates overload on land and adding weight intensifies the workload, adding equipment in the water serves the same purpose to increase workload.
- Using equipment to create more resistance and a higher intensity/ workload for both muscular fitness and cardiorespiratory conditioning.
- Aquatic equipment allows you to create progressive overload in the aquatic environment for training or rehabilitation.
- Aquatic equipment adds variety to a workout and variability for physiological parameters. Equipment introduces eccentric contractions, and various types of resistance.
- Aquatic equipment can be used to aid a client's form, alignment, stability, and balance.

There are several types of aquatic equipment available, typically divided into six primary categories. Following is a brief description of each category.

Buoyancy Equipment:

Buoyancy aquatic equipment includes foam hand bars, balls, cuffs, wafers, noodles, bars, and boards. This equipment is primarily made of closed cell foam to resist mildew and moisture saturation, and has a decent shelf life. There is little or no need for repair with periodic replacement being the primary ongoing expense. The size of the equipment, shape, density of foam, lever length and speed of movement all contribute to determine the level of resistance provided by the equipment.

A primary form and alignment consideration is shoulder girdle elevation. When a client's underused lower trapezius become tired from holding the shoulder girdle down against the buoyed resistance, the shoulders tend to elevate. This leads to risk of shoulder impingement. Proper form includes movement from the glenohumeral joint with the shoulder girdle in neutral position. It is important for the fitness professional to fully understand and be adequately trained for proper form and technique, proper targeting of muscle groups, and proper progression with buoyancy equipment.

The muscle action equation for buoyancy equipment is movement assisted (eccentric action) toward the surface of the water, and resisted (concentric action) toward the pool bottom. It is important to understand the biomechanics of buoyant equipment use in order to provide a safe and effective workout.

Weighted Equipment:

Weighted aquatic equipment includes wrist weights, ankle weights, handheld weights, and weight belts. Look for water resistant products, or those designed for use in the water. Although use of weighted equipment seems counterproductive in the water, there is application in sports specific and rehabilitation settings. Safety factors include use of attached weights and increased risk of drowning. Clients should be closely supervised. It is

also important to remember that weight belts increase impact in the water. Clients coming to the water to reduce or avoid impact should not use weight belts or be closely monitored.

Resistance is primarily determined by the amount of weight being used. The muscle action for weighted equipment is the same as on land, only the water's buoyancy may slightly reduce the resistance and the water's drag properties may increase the resistance. Movement toward the surface of the pool is resisted (concentric action) and movement toward the pool bottom is assisted (eccentric action). Weighted muscle action works opposite to buoyancy muscle action in the water.

Drag Equipment:

Drag aquatic equipment includes webbed gloves, fins, cuffs, paddles, and various types of hand held resistance. It is relatively durable, and replacement costs are the primary expense after your initial purchase. It creates resistance in all directions and all planes of movement, working with the multidirectional resistance of the water. As with buoyant equipment, the size of the equipment, shape, surface area, lever length of arm or leg, and speed of movement all contribute to determine the level of drag resistance.

The muscle action for drag equipment consists primarily of concentric muscle actions due to the water's multidirectional resistance. Although eccentric muscle actions occur in the antagonist muscle during the deceleration phase of range of motion, the primary action remains concentric. Drag equipment works both parts of a muscle pair in a complete repetition. For example in a standing arm curl, both the biceps and triceps muscles are trained with drag equipment. You do not have to do a separate exercise for each muscle or group.

Rubberized Equipment:

Rubberized equipment includes tubes and bands. Many of the rubberized equipment purchased for use in land fitness programs can be used in the water as well. Look for chlorine resistant brands to extend equipment life. Bands and tubes are relatively inexpensive, and the primary cost after your initial purchase is replacement.

The muscle action equation for rubberized equipment in the water is the same as on land. The water's resistance may add some additional work. The primary muscle group being worked and the type of muscle action are dependent upon the placement of the anchor point. Movement away from the anchored point is resisted (concentric action) and movement toward the anchored point is assisted (eccentric action).

Summary of muscle actions with buoyancy, weighted, drag, and rubberized equipment.

**Exercise: Standing Arm Curl
Flexion and Extension of the Forearm at the Elbow**

| Movement | Buoyancy | Weighted | Drag | Rubberized anchored low | Rubberized anchored high |
|-----------------|--------------------|-------------------|--------------------|--------------------------------|---------------------------------|
| Flexion | Eccentric triceps | Concentric biceps | Concentric biceps | Concentric biceps | Eccentric triceps |
| Extension | Concentric triceps | Eccentric Biceps | Concentric triceps | Eccentric biceps | Concentric triceps |

Neutral Buoyancy Equipment:

Neutral buoyancy, or the ability to float at the water's surface, is typically created with belts, vests, and noodles. There are shoulder impingement issues with "hanging" or being suspended from hand held buoyant equipment for long periods of time, so it is not recommended. Buoyancy equipment attached to the body is considered safer and more effective. Neutral buoyancy equipment is not typically used to create resistance to movement, but to create neutral buoyancy instead. Based on current research, to maximize proper form, technique, and energy expenditure in deep water exercise, a neutral buoyancy belt, vest, or noodle is highly recommended. It is clear that proper vertical position improves the effectiveness of deep water vertical exercise.

Additional Aquatic Equipment:

There are several other types of aquatic equipment including aquatic bikes, treadmills, cross trainers, swim tether systems, swim/ water walking current systems, aquatic steps, and aquatic exercise stations that attach to the side of the pool. There are now spas available with one end designed for relaxation and the other end outfitted with aquatic exercise stations for resistance training.

Progressive Overload:

Progressive overload is essential in any exercise program. Many research and rehabilitation studies using aquatic equipment have fallen short due to the inability to document and control progressive overload in the water. If you want to be able to document positive changes in your client with aquatic equipment, you need to properly practice, monitor, and record progressive overload just as you would in a land resistance training program.

There are three primary ways that progressive overload is manipulated in the water. The first is through the equipment itself. For example, most brands of buoyant hand bars come in different sizes. You can progress from the smallest size to the largest size with a typical overload progression repeating the cycle of increasing reps/ same resistance to increasing resistance/ decreasing reps and then gradually increasing reps until more resistance is added. An example for drag equipment would be progressing from open hands, to webbed gloves, to holding fins, to holding paddles, gradually increasing surface area to increase overload.

The second way to progressively overload is to increase the number of repetitions in the same amount of time. Progress your client from 20 repetitions in 45 seconds to 25 and then 30 repetitions in 45 seconds. Use a stop watch or pace clock. The key to this type of progression is to make sure the client is maintaining the same range of motion, or the workload is watered down. You tend to decrease range of motion when intensity increases, and maintaining range of motion is critical to aquatic intensity.

The third way to monitor progression is to use beats per minute with a metronome. You can start repetitions at 30 beats per minute and gradually increase to 40 beats per minute. Once again, the client must maintain the same range of motion and proper alignment. Using a clip on digital metronome really adds quality and control to an aquatic resistance training program enabling specific control of intensity and progression.

Aquatic Equipment Additional Considerations:

Any equipment purchase can be a major expense. It is important to consider storage issues, pool characteristics, and staff training before taking the plunge.

Proper storage of aquatic equipment is essential to longer life. Proper drainage and ventilation are primary considerations. Make sure to secure the equipment to avoid theft and

liability issues. There are securable racks, bins, and bags available for deck or closet storage. Portable storage such as a rolling rack or bin makes it easy to transport the equipment from storage to the pool deck. Storage costs should be factored into initial equipment purchase expenses.

Pool characteristics determine your ability to effectively use aquatic equipment in your environment. Pool depth, pool accessibility, water temperature and pool bottom/ slope may all play a roll in equipment use. Equipment requires more working space for each client, so you may need to reduce the number of clients in the pool at the same time with equipment. Try the equipment before you buy it to be sure it will allow for safe entry and exit of the pool. Also consider ease of use for each client and population for which you intend to use the equipment.

The final and probably most important consideration is staff or professional training. If you are not trained to use the equipment you won't use it, you will not use it effectively, there may be safety and liability issues, and you won't take care of the equipment properly which will shortening its life. Many equipment venders have written material, DVDs, interactive computer CDRoms, and workshops to help you learn to use the equipment properly. You can get equipment training at several professional workshops or conferences. Time spent training to use aquatic equipment properly is time well spent.

In summary, proper care and use of equipment extends the equipment's life and lowers safety risk. Staff training is a critical component of your equipment purchase. Careful planning leads to a wise investment in aquatic equipment which can enhance your programming and improve your bottom line.

Bibliography:

Aquatic Exercise Association. 2010. Aquatic Fitness Professional Manual. 6th Edition. Human Kinetics.

Chewning, J. 2010. "Buoyant Development." Workshop presented at International Aquatic Fitness Conference: Aquatic Exercise Association.

Lindle, J. 2006. "Aquatic Equipment: Body and Program Benefits." Workshop presented at World Aquatic Health Conference: National Swimming Pool Foundation.

Chewning, JL. 2004. Applied Anatomy: Land and Water. Fitness Learning Systems. www.FitnessLearningSystems.com.

Aquatic Exercise Association. 2001. Aquatic Personal Trainer Manual. Aquatic Exercise Association.

Aquatic Equipment Resources

Fwonline.com

Keiferpool.com

Sprintaquatics.com

Hydrotone.com
Hydrofit.com
Speedo.com
Aqualogix.com
Spriproducts.com
Aquajogger.com
Spongexcorp.com
Hydrorider.com
Watergear.com
Watergym.com
Aqxsports.com
Speedo.com
Waterart.org

June M. Chewning, M.A., B.S.

June Chewning is president of Fitness Learning Systems, a company that provides innovative continuing education products for the health-fitness industry. June has been presenting educational health/ wellness lectures and fitness classes to corporations and instructors since 1985. June serves on the AEA Research Committee and is recipient of the AEA 1995 Achievement Award, and 2001 and 2009 Contribution to the Aquatic Industry Award. She serves as adjunct faculty for Cincinnati State College and developed several course curriculums for the Health-Fitness Technician degree program.