

The Water Skiers with Disabilities Association routinely receives requests for information on where adaptive water ski equipment can be acquired. As a service to our members, WSDA has developed the following descriptive list of common adaptive equipment and manufacturers and retailers that offer this equipment. This list is offered as a service to our members and is in no way an endorsement of the products listed.

ARM SLING

Ray Delgar invented the first arm sling and handle in England in the mid-1970s. The Delgar Sling is a modified slalom handle for use by single-arm or –hand disabilities. Approximately two inches of exposed handle fit inside a short tube that is attached to a harness worn around the skier's shoulders. The pull on the handle is then shared between the good arm and the opposite shoulder. Release from the device is automatic when the skier lets go of the handle.

Since the advent of the Delgar Sling, many modifications and improvements have been made to arm slings. (Figure 1) There are a variety of slings available that utilize different configurations of shoulder or torso harnesses that dictate where the pull on the body comes from.



Figure 1 - Arm Sling

Typically, beginner and slalom skiers prefer a harness that pulls from the shoulder, while jumpers that cut to the jump prefer a pull from mid-torso or lower. Many advanced single-arm tournament skiers have different specialty slings for use in jump or slalom events.

SIT SKIS

The “sit ski” was first developed in Belgium in the 1960’s. The original sit skis were huge planks of wood sometimes over eight feet long and two feet wide. These skis had flat bottoms, a curved-up nose, and a simple metal frame to keep the user from being pulled forward. The modern sit ski was developed by Royce Andes in the early 1980’s. The **Kan Ski** was superior to the older sit ski by incorporating several aspects of the stand-up skier’s slalom ski. A concave bottom, rounded edges, fiberglass and graphite composites, and competition type slalom fins were integrated into the design. One of the biggest changes was

the raised seat, or **cage**, which enabled the skier to place the ski onto a greater edge angle with less effort and to utilize a narrower ski without dragging her hip in the water.

Beginner Skis

Today there are several manufacturers of sit skis, but all have several common aspects. Typically, beginner skis are wider (approximately 15 inches or more in width) and have some type of a **starting block** or cleat to hold the rope at the tip. The starting block assists the skier to obtain a planed position on the water during the challenging process of a deep water start. Beginner skis also have flat bottoms or shallow concaves that add to the stability of the ski. This type of ski is suitable as a beginner ski or for individuals needing added stability.

Intermediate / Advanced Skis

Intermediate-advanced skis are not as wide as the beginner ski, typically in the 10-13 inch range. These skis have many of the qualities of their stand-up counterparts and incorporate deeper concaves, performance-enhancing edge designs, and adjustable “competition” type fins. Typically, this type of ski does not have a starting block, so the skier must be able to start with the rope in hand. This ski is easier to put on edge than the beginner ski but may feel a bit more precarious to the novice skier.

Sit skis can be purchased with a variety of cage height and width combinations. Although not standardized, most manufacturers have elected to utilize the same base pattern as that of the original Kan Skis, allowing cages from different manufacturers to be placed on a variety of sit skis.

Jump Skis are specialty skis built for the competition orientated jump skier. Typically, the jump ski will have a flat bottom and ninety degree edges. Although built for the competitive jumper, these skis are very stable and can be used by the beginner skier.

Trick Skis are designed to perform maneuvers such as 360-degree spins and other “tricks” both on the surface of the water and in the air. For tournament use, a trick ski is defined as a ski that is no wider than 30% of its length. Although trick skis specific for the sit down skier are available, many skiers use wake boards and kneeboards as trick skis. Sometimes a wake board or knee board will need to be cut narrower to make it “legal” for tournament use but will be fine for the recreational skier. Mounting a cage on a wake board or kneeboard will require a modification to the cage or necessitate special brackets (clamps) to secure the cage to the board.

Outriggers for Sit Skis

Outriggers are two short ski tips attached to the sides of a sit ski. Similar to those used on an outrigger canoe, outriggers on a sit ski greatly increase the stability of the ski. Outriggers assist individuals who otherwise may not have the ability or balance to stabilize a sit ski. They can be attached to any sit ski but usually are used in conjunction with a beginner ski. Outriggers can be easily constructed and plans can be found below.



Figure 2 - Skier using beginner ski with outriggers and secured handle.

Back Support for Sit Skis

The sit ski back support is a padded backrest that easily attaches to the upright supports at the rear of the cage.

When the support is in place the skier can't fall out the back of the cage and onto the tail. This allows skiers with limited or no sitting balance to ski independently. The back support will also benefit skiers with extensor spasticity from bracing with their legs and pushing themselves out the back of the cage.

SEATS FOR SIT SKI (CAGES) Most sit skis can be purchased with a variety of cage height and width combinations. Although not standardized, most manufacturers have elected to utilize the same base pattern as that of the original Kan Skis allowing cages from different manufactures to be placed on a variety of sit skis.

TRICK SKI/WAKEBOARD SPACERS

Cage shims or spacers make a flat surface on a trick ski or wakeboard. These spacers allow the cage to be evenly supported when mounted to a ski with "rocker".

WAKEBOARD-CAGE MOUNTING CLAMPS

There are a variety of clamps and brackets that utilize the wakeboard manufacturers binding inserts to secure a sit ski cage to a wakeboard. Using a clamp system allows the mounting of a cage to a wakeboard without drilling new holes or adding inserts.

RISER PLATES

Riser Plates can be used to raise a cage or footplate up/off of the deck of the ski. Riser plates are useful for programs that have a limited number of cages by

making shorter cages ski taller or by raising footplates to fit shorter skiers in taller cages.

Riser Plates are also useful for the intermediate/advanced skier that wants to get higher off the surface of the water to allow for higher edge angles (increased edging/tipping)

EDGE TRIPLE BAR

This device was named after Tony Edge, one of the founders of the British Disabled Water Ski Association (BDWSA). The Edge Triple Bar is a six foot handle which is actually three metal tubes that can interlock and then slide apart into three separate handles attached to the boat by three individual tow lines. (Figure 3) The triple bar enables two instructors to physically assist a beginner to start and gain his balance, then separate completely and smoothly from the student and leave him to ski solo. The Edge Triple Bar is an inexpensive substitute for the training boom (barefoot boom). Plans to construct an Edge Triple Bar are available from the BDWSA. (Directions to construct an Edge Triple Bar can be found at: http://www.zyworld.com/bdwsa/TRIPLE_BAR1.DOC or contact BDWSA at: www.bdwsa.org.uk)

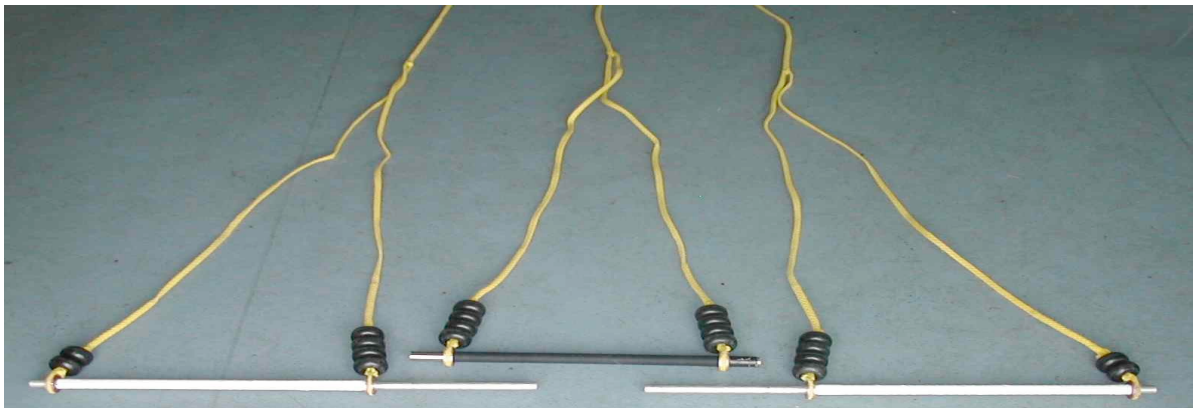


Figure 3 Edge Triple Bar separated into three handles.

SKI TIP CONNECTORS

Ski tip connectors (STCs) are used to attach a set of double skis together for individuals having difficulty controlling the skis (e.g. skis are drifting apart or crossing). STCs should be made available in a variety of lengths. The appropriate length of an STC will allow the skis to be approximately shoulder width apart. STCs can be placed at the tip only or, for additional stability, at the tip and tail. (See below for instruction on making ski tip connectors.)

EQUIPMENT MANUFACTURES and RETAILERS

LIQUID ACCESS

Address: 2240 Turtlemound Road
Melbourne, Florida 32934
Phone: 321.259.2868 or 321.537.1900
E-mail: Liquidaccess@aol.com
Website: www.liquidaccess.org

Products Offered:

Arm Sling

Back Support Cage

Cages

Footplate

Outriggers

Sit Skis: beginner, intermediate, advanced, and jump
skis **Ski bags**

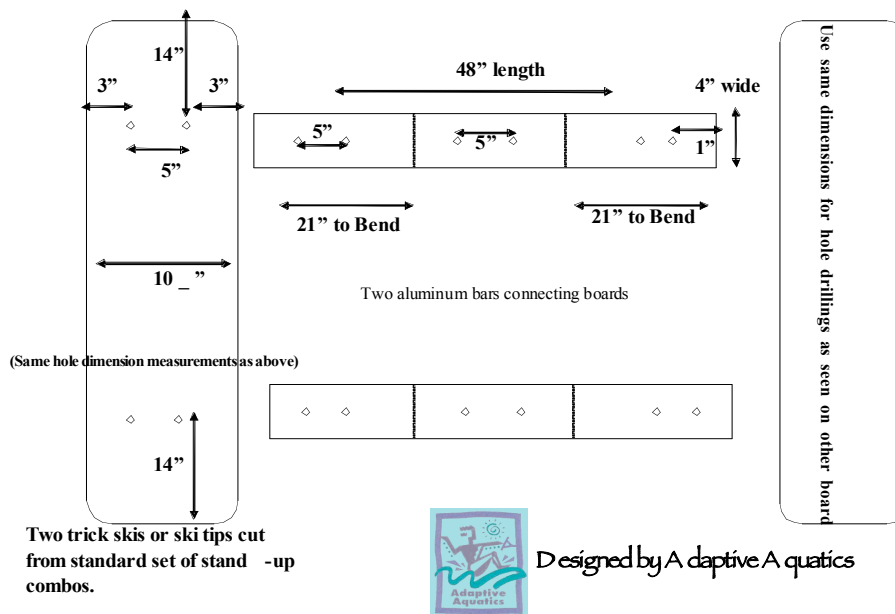
Trick Ski Cage Clamps

“BUILD YOUR OWN”

OUTRIGGERS

Outriggers are made from trick skis or short ski tips cut off a pair of regular stand-up doubles. The ski tips are connected by a pair of aluminum strapping. This strapping is sandwiched between the sit ski and the cage and is bent to a 15 degree angle. The lower the angle, closer to parallel with the ski, the more stable the ski becomes. The higher the outriggers are out of the water, the more maneuverable the ski is.

Outriggers Dimensions for Sit Skies



SKI TIP CONNECTORS

Place $\frac{1}{4}$ " x 20 inserts into the tips of both skis approximately where the tip begins to curve up. Use 1" x $\frac{1}{4}$ " aluminum strapping or nylon/plastic bar stock and through-bolt the bar into the ski tip insert. Wrap the aluminum bar in foam for additional safety and to keep the bar from sinking in the event the connector is adjusted over water.

A second alternative is to place a small eye screw at the tips of both skis approximately where the tips begins to curve up. Place a cord through a length of $\frac{1}{4}$ " - $\frac{1}{2}$ " PVC pipe and attach the cord to both eye screws.

A third solution is to run a loop of 1" inner tube or surgical tubing through PVC pipe and stretch both ends of the loop over the ski tip. Although this solution is temporary and may move slightly on the ski, it will allow connecting skis together without permanently altering or damaging the skis.

For extra support, a ski tip connector may be placed on the tail of the combos. Regardless of how the skis are attached, the connector bar(s) should be a length that will keep the skis shoulder-width apart.