



# **Adaptive BI-SKI**

## **Exam Information**

Revised 2011

## ADAPTIVE BI-SKI EXAM INFO

The bi-ski is a type of adaptive equipment that is designed for any skier who has significant problems standing and balancing while in motion. These problems could be caused by physical trauma or neurological muscular impairments. In addition there are some skiers who have progressive or degenerative types of disabilities. They may have started skiing as a two or four-tracker but will eventually become a sit-down skier due to the progressive nature of their disease.

### **Types of Disabilities commonly seen with Bi-Ski students include:**

Balance impairments

Multiple Sclerosis (MS)

Brain injury and other progressive diseases

Cerebral Vascular Accident (stroke)

Neuromuscular diseases

Cerebral Palsy (CP): spastic, athetoid, flaccid, ataxic, rigid

Post Polio

Quadruple Amputee

Dwarfism

Spinal cord injuries (SCI)

Epilepsy, severe

Paraplegia, quadriplegia and others

Mental Retardation

Spina Bifida

Muscular dystrophy (MD)

## **Evaluation of Students**

Treat every student as an individual; the effects of an injury or disability can vary from student to student. A complete and detailed student analysis is needed to determine which piece of equipment is best suited for the student. Determining factors are their physical strength, mobility, ability to maintain balance, level of injury and whether or not the spinal cord break is complete or incomplete. Only through a thorough student assessment can one determine proper equipment selection. A quick rule of thumb is a T-6 and lower level of injury will use a mono-ski. Higher levels of injuries usually use a bi-ski. Each injury is somewhat different. The effects of a T-6 injury in one individual may vary from the same level of injury in another individual.

Medications can also be a source of concern. Verify any side effects a student may be experiencing as a result of medications. Additionally, you can obtain valuable information by knowing what other activities your student may be involved in. Much of this information can be obtained from the student, parent or guardian along with the information provided in the student's application or evaluation. Some medical concerns associated with mono and bi-skiers include; bladder management devices (i.e.: leg bag, catheter, etc.), pressure sores, sensitivity to hot or cold, and poor circulation problems.

Another point of concern is autonomic dysreflexia (AD). This is a potentially life-threatening hypertensive occurrence produced by the body's inability to sense and react to specific stimuli. Symptoms include a feeling of impending doom, flushing of the skin, sweating, blurred vision and/or a sudden change in the ability to comprehend or communicate. Common causes include bladder or bowel distension, pressure sores, severe cold and heat, or severe blows to the body or head. If an instructor suspects AD take immediate action to eliminate the cause. Keep the skier upright, loosening the straps, and readjusting the skier or take the student to the rest room or inside a warm building to help resolve the problem.

## **Equipment and Set Up**

Take time to initially set up and evaluate a student to determine which type of equipment is best for them. Do not rush the set up for the first-time skier. Proper time spent during the initial set up will equal success for the student in the long term and a better return and enjoyment of the sport.

The bi-ski has a "boot", seat and frame system that is mounted to a suspension system, which is usually mounted on two short skis with a radical side cut. Most bi-skis have fixed outriggers that can be mounted on the frame of the bi-ski. These outriggers can be adjusted as needed or removed. Bi-skis have a tethering system that allows the instructor to assist the skier in turning, speed control or in emergency situations. If fixed outriggers are used, it is mandatory to use a tether strap and safety loop to assist the student and safely control the bi-ski.

If the skier possess the necessary strength, balance and agility, hand held outriggers maybe used in place of fixed outriggers and the skier may be able to ski independently. However, it is suggested for someone using handheld outriggers to remain on tethers until they have become an upper level intermediate/advanced skier and can control their turns and speed safely on their own. Some bi-skis have a self-loading device that allows some bi- skiers to become independent skiers. However, most bi-skiers still need one or two lifting/loading assistants.

A complete physical evaluation will help determine how the bi-ski should be adjusted. As with the mono-ski, the bi-ski must be properly balanced and the skier must be properly fitted to the seat system.

The majority of disabilities utilizing the bi-ski are spinal cord injuries, multiple sclerosis, muscular dystrophy, cerebral palsy, severe epilepsy, severe balance impairments, and traumatic brain injuries.

## **Bi Unique Ski**

### Lift Loading Procedures – General Overview

The following are general procedures for an instructor-assisted chair loading and unloading of bi-skis.

- Lead instructor calls a count or cadence (example: Ready, 3, 2, 1, Lift Up and Back) when in the loading zone of the chair lift. It is a good idea to practice a lift with the assistant instructor and/or student out of lift lines and before the first load of the day for timing and safety concerns. For safety reasons, attention of the Lift Operator may be needed to assist with a pullback or to attend to the 'stop button' in case of a misload.
- Once on the chair lift, first put safety bar down and then attach safety strap and carabiner to the chair.
- Keep safety bar down during entire ride. It is a good idea for the instructors not to lean on the safety bar.
- Disconnect the safety carabiner and strap usually when you have passed the final lift tower, when it is safe, before the unloading platform. Do not lift the safety bar until the chair is over the netting of the unloading ramp or close to the snow.
- When at unloading area, lead instructor calls a count or cadence (example: Ready, 3, 2, 1, lift up and down) and the lead instructor continues to guide/bucket assist the student off to the side out of the unloading area.

## **Safety Issues and Lift Evacuations**

The NSAA “Your Responsibility Code” applies to all bi-skiers. All instructors should understand the hand signals for communication with lift operators (i.e.: slow, stop, and maintain speed). Some hand signals may differ from ski area to ski area. The National Ski Patrol recommended procedure for a bi-ski lift evacuation is termed a double carabiner with opposing gates. Evacuation carabiners should only be mounted to a manufacturer-suggested evacuation strap (i.e. single- or three-point strap system). The evacuation system should be always ready for evacuation and NOT intertwined with the bucket straps of the skier.

### **Lift Loading Assists:**

- Always lift with the back straight, in a wide stance and using the legs and biceps. It is extremely important to lift correctly.
- Make sure proper communication has occurred between the Adaptive Guest, Instructor and Lift Operator.
- There are three assists the Lift Operator may use with sit-down skis:
  1. pull back from the back of the chair,
  2. lift and push back from the footrest,
  3. side lift and push back. Lift Operator reaches over the chair grasps the handle on the back of the sit-down ski and pulls it back onto the chair. This is used mostly for fairly independent mono skiers.

Volunteer Assistant or Lift Operator grasps the footrest with both hands, standing looking directly at the Adaptive Skier and on-coming chair. With back straight and legs bent, in a wide stance, the Operator lifts with legs and pushes the seat up and back on to the chair. This is used for a bi-skier who has one or two people assisting with the lifting on to the chair. Otherwise this same assist can be used for the fairly independent mono-skier and for a small student in a bi-ski with an instructor that just needs that extra push back on the footrest.

Ski Instructor or Assistant stands at side of sit-down ski with skis pointed in the lift direction, hips and shoulders turned slightly toward bi-ski, and lifts with legs.

Lift Operator, standing at 90 degrees to lift direction, grasps handle on foot rest, and at front of seat area, with back straight and legs bent, in a wide stance, with palms up, and lifts with legs.

## Thoughts & Considerations When Learning to Tether a Bi-Ski:

### Attaching the Tether(s) to the Ski.

- Two points of attachment to ski
- Two tethers versus Single tether
- Low on the ski / High on the ski
- Single point of attachment to ski
- Low on the ski / High on the ski
- Body alignment in relationship to the instructor's skis and bi-ski,
- Should be uphill and slightly behind to allow guidance of tethers to edge the bi-ski or release the edges. Body positioning is very important to the success of tethering.

### Tethering Techniques

- Emergency stop, Core control and arm alignment – example of poor alignments will flip the ski or not allow enough strength to stop.
- Exercise – hold arms high, low and in-between. Arm position similar to carrying ski poles is usually the most effective.
- The instructor tethering should be in sync. with the bi-skier and should never cross the gravity line before the bi-ski. Look for subtle cues to such as a head tilt, to start your initiation.
- Without hindering the ski, allow the skier to free-ski, turn assistance if needed with light guiding of tether lines, used as 'teaching tethers', not a control device.
- Safety emergency stop and bucket assist to a stop.

### Tethering exercises

- At home watching TV, attach tether lines to a chair and practice wrapping and unwrapping lines this will aid in slack control. Tether handling, slack control, release and gather the tether – make sure you don't have slack to trip over
- Ski in pairs - synchronized skiing, one skier tethered (student), one skier (instructor) in control providing assistance with the tethers.
- Feel how different techniques affect the student – full control vs. gentle guiding
- Compare and contrast
- Switch student and instructor. Continue with practice exercises.
- Develop strong skiing skills for safe tethering.

### Tether Etiquette

Optional techniques may be presented based on specific ski area management or mountain safety codes. These techniques will attach you, the instructor, to the tether line so you may not be separated from the student in case of a fall.

- Climb loop with carabiner
- Slip knot over wrist
- Attach to the tether
- Loose knot in the tether line, placed around the wrist. Tight enough, not to fall off, loose enough to escape is necessary, about the same as a ski pole strap.

### **Adaptive Bi-Ski Progression**

**The following is based on the PSIA Alpine National Standards and has been adapted for bi-skiing.**

#### **Beginner / Novice Zone Objectives**

##### **Level 1: Welcome to skiing / Build the foundation**

Student assessment

Medical history

Equipment selection, introduction and set up- fixed riggers or handheld

Static balance exercises and introduction to effective body movements, indoors

Student/instructor communication, safety and emergency stop

##### **Level 2: Introduction to Flats**

Pushing, turning, pivoting on flats – assisted

Static balance exercises, outdoors on flats

Assisted fall and getting up

Chair Lift and Green Terrain Chair lift loading and unloading procedures

Review lift evacuation procedures

Student assisted/instructor assisted chair lift load & unload

Outrigger position and timing during loading and unloading

Straight runs – emergency stop

Outrigger and body position while moving

Stopping and slowing

##### **Level 3: Introduction to Turning**

Turning left & right through balance and edge control movements.

Vary turn shape and size.

Speed control

Turning to a stop

Fan progression

Linked turns

Master beginner area

Develop greater skill blending

#### **Level 4: Explore the beginner mountain experience**

Vary turn shape and size for terrain and condition  
Explore a variety of snow conditions

#### **Intermediate Zone Objectives**

#### **Level 5: Develop and Enhance Intermediate Movement Options**

Appropriate outrigger movements (outrigger lead change)  
Refine effective body movements and position  
Develop long to medium and medium to long radius turns  
Edge control exercises for bi-ski

#### **Level 6: Anchor Intermediate Skills and Movements**

- Medium to short radius turns
- Ski varying snow conditions
- Proper body movements
- Upper/lower body separation
- Hip and lower body angulations
- Independent lift loading and unloading
- Skidded hockey stops for bi-ski

#### **Level 7: Exploring Movements and Skills for Upper Level Skiing**

Bump skiing on easy blue terrain  
Short radius turns  
Explore carving sensations  
Spinal cord extension at turn initiation  
Total independence  
Hip check turns for bi-skis

#### **The Advanced Zone Objectives**

#### **Level 8: Refining Advanced Movement Patterns**

Carving medium and long radius turns  
Ski short turns on the steeps  
Ski blue and easy black bumps  
Boot top powder  
Braking, gliding control movements on steep terrain



## **Level 9: Develop Movement Options for Steep Terrain**

Refine movements in short radius turns

Develop optional movement patterns for varying speed control and conditions

Develop optional movements and skiing tactics for advanced bump skiing

Bumps, racing, off-piste, terrain parks and pipes