PSIA-*Rocky Mountain*-AASI
ADAPTIVE EXAM GUIDE
for
MONO-SKI

Mono-skis are specialized adaptive equipment designed for students with significant problems standing and balancing while in motion. Such problems can be caused by physical trauma or neuromuscular disorders.

Types of Disabilities Common to Mono-Skiers

These are some of the most common disabilities for which a mono-ski may be used:

- Amputation
- Balance Impairments
- Cerebral Palsy (CP)
- Cerebrovascular Accident (CVA/stroke)
- Epilepsy
- Limb Deficiency
- Multiple Sclerosis (MS)
- Muscular Dystrophy (MD)
- Neuromuscular Diseases
- Paralysis & Paresis
- Polio
- Post Polio Syndrome
- Spina Bifida
- Spinal Cord Injury (SCI)
- Traumatic Brain Injury (TBI)

In addition, there are some skiers who have progressive or degenerative types of disability. They may have started skiing as a two-, three- or four-tracker but will eventually become a sit-down skier due to the progressive nature of their disease.

Evaluation of Student

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 physical strength, mobility, ability to maintain balance and level of injury. A thorough student evaluation is necessary to determine proper equipment selection.

For spinal cord injuries, a general rule of thumb is that a student with a T-6 and lower level of injury uses a mono-ski. Students with 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. In addition, a person may have an *incomplete spinal cord injury.* This means that there is some level of motor and/or sensory function below the level of injury.

Some medical concerns associated with mono-skiers include bladder management devices (e.g., leg bag, catheter, etc.), pressure sores, spinal fusion, sensitivity to hot or cold, and poor circulation.

Another point of concern is autonomic dysreflexia. This is a potentially life-threatening, hypertensive occurrence produced by the body's inability to sense and react to specific stimuli. Possible symptoms include a feeling of impending doom, flushing of the skin, sweating, blurred vision and 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 autonomic dysreflexia, immediate action should be taken to eliminate the cause. The student is kept upright, straps are loosened and he/she is taken to a warm place. Ski Patrol should be called immediately—this is a medical emergency.

Medications taken by the student can also be a source of concern, so it is important to determine any side effects the student may be experiencing. Additionally, it is valuable to know other activities in which the student participates. Much of this information can be obtained from the student, parent or guardian, as well as from the student's application or evaluation.

The majority of the skiers who use a mono-ski have a spinal cord injury, amputation or spina bifida. Good strength, balance and agility are helpful in becoming a successful mono-skier.

Equipment and Set Up

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

For example, you may observe a student who is over-turning to the point of facing uphill. This student may have an appropriate skill blend for the task, yet still have difficulties. It is very possible that the student may have been set up incorrectly with the center of balance too far forward. Instructors need to ascertain whether the issue is mechanical (equipment related), or bio-mechanical (technique related), or both. In this example, the student's problem is a mechanical issue.

The mono-ski is a single ski unit, which includes a seating system (the boot) mounted on a suspension/shock absorption system. Most of today's mono-skis have self-loading devices that assist when being loaded onto chairlifts. Often mono-skiers develop the ability to push themselves up onto the chair (self loading). This allows for independent skiing. Mono-skiers also use outriggers to assist with balance and loading the chairlift.

The “boot”, (or seating system), acts much like a two tracker’s ski boot. The boot should have a snug fit around the skier’s body with no major air spaces, so that movements from the mono-skier’s body are easily transferred to the ski. A good way to accomplish this is to fill all air pockets with foam/padding.

Dowel testing

The mono-skier should also be properly balanced. This is primarily achieved with a thorough set up process. After all adjustments have been made to seating, padding, frame length, trunk support and outriggers, a dowel test can be performed. The dowel test is used to determine where the mono-ski should be placed relative to the center of the snow ski. Proper placement allows the mono skier to take advantage of the frame / ski set up for optimum on-snow performance.

A section of wood closet rod 1.5” in diameter works well for the dowel. Follow these instructions to perform a dowel test:

1. Determine the ski center. The ski center is the manufacturer’s designed center of the ski, where the ski performs at its best.
2. The student should be dressed in full ski clothes and helmet. Assist the student, as necessary, in transferring to the mono-ski.
3. Have the student position the outriggers on his/her arms.
4. Place the dowel under the mono-ski, perpendicular to the mono-ski and at ski center.
5. Have the student assume an athletic position and then position the student so that he/she is balanced on the dowel. The student should be able to tip fore and aft with minimal movement of the head, while maintaining a functional mono-skiing stance. If the student cannot balance, move the dowel slightly forward or back as necessary until the balance point is achieved.
6. The point at which the student balances, directly above the dowel, is roughly his/her center of mass. Mark this point on the frame of the mono-ski where it interfaces with the snow ski.
7. Align the mark on the frame over the ski center. This is a reasonably good place to begin for an entry level skier and take best advantage of the ski’s technical design.
8. The dowel center can be adjusted to assist the skier in more easily accomplishing specific goals in turning. Aligning the dowel center slightly forward of the ski center facilitates easier turn initiation and shorter radius turns. Aligning the dowel center behind the ski center creates a more carved, longer radius turn.
9. Remember, adaptive skiing is full of variables, such as individual student needs, different types of mono-skis, etc. Proper set up, along with careful on-snow observation, knowledge of the equipment and sound fundamental teaching techniques develop a properly balanced mono-skier.

Safety Issues and Lift Evacuations

Be aware of these points to keep your mono-ski lessons safe:

- The NSAA *Your Responsibility Code* applies to all mono-skiers.
- Instructors need to understand the hand signals for communication with lift operators (i.e., slow, stop, and maintain speed). Some hand signals may differ by ski area.
- Evacuation straps on the mono-ski should be regularly checked for wear and be replaced or repaired as necessary.
- The National Ski Patrol recommended procedure for a mono-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 always be ready for evacuation and not intertwined with the bucket straps of the skier.
- Evacuation is always directed by Ski Patrol and it is at their discretion to use an alternate system.

General Overview of Lift Loading Procedures

These are general procedures for instructor-assisted chair loading and unloading of mono-ski students:

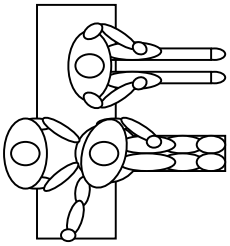
- Lead instructor calls a count or cadence (example: *Ready, 3, 2, 1, lift up and back*) when in the loading zone of the chairlift. For timing and safety concerns, it is a good idea to practice a lift with the assistant instructor and student out of lift lines and before the first load of the day.
- A lift operator should attend the stop button in case of a misload. If a second lift operator is available, that person may assist with the lift loading.
- Once on the chairlift, attach safety strap and carabiner to the chair. Some programs and students may put the safety bar down. When using the safety bar, keep it down during entire ride and take care not to lean on it, as this might put extra weight on the student's legs.
- After you have passed the final lift tower before the unloading platform, disconnect the safety carabiner and strap and lift the safety bar. Make sure all straps, clothing and outriggers are free of the chair so that you have a clean unload.
- At the unloading area, the 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 the chairlift and to the side, out of the unloading area.

Lift Loading Assists

Chairlift loading procedures vary at resorts due to chair or loading area configuration, program parameters and resort parameters. Keep in mind these general guidelines for lift loading assists:

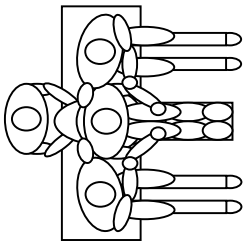
- Always lift with the back straight, in a wide stance and using the legs and biceps.
- Make sure proper communication has occurred between the student, lead instructor, assistant instructor and lift operator.
- There are four assists that may be use with mono-skis: a) pull-back, b) lift and pull-back, c) lift with a front push-back and d) lift with a side push-back. **Remember that one lift operator should always attend the stop button in case of a misload!** If a second lift operator is available, that person may assist with the lift loading.

a) Pull-back

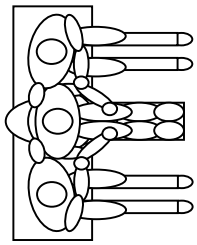


The lift operator reaches over the chair, grasps the handle on the back of the mono-ski and pulls it back onto the chair. This is usually used for fairly independent mono-skiers.

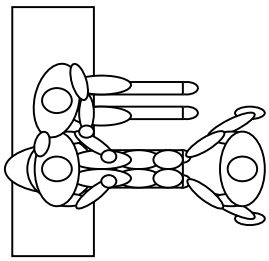
b) Lift and pull-back



The lead instructor and assistant instructor stand on either side of the mono-ski, with skis pointed in the lift direction, hips and shoulders turned slightly toward the mono-ski and chair. They grab the side handles. While they are lifting up and back from the sides, the lift operator reaches over the chair, grasps the handle on the back of the mono-ski and pulls it back onto the chair. If a lift operator is not available for lift loading assistance, the lead instructor and assistant instructor may perform a lift up and pull-back by themselves.



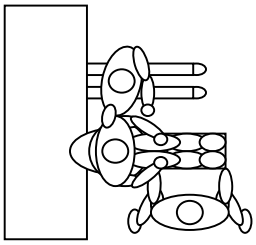
c) Lift with a front push-back



The instructor stands at the side of the mono-ski, with skis pointed in the lift direction, hips and shoulders turned slightly toward the mono-ski and chair. The lift operator stands in front of the student, looking directly at the student and the on-coming chair and grasping the foot rest with both hands. While the instructor lifts up and pulls back from the side, the lift operator lifts from the front and pushes the seat up and back onto the chair. This is used for a mono-skier who has one or two people assisting with the lifting on to the chair. It can also be used for a fairly independent mono-skier.

d) Lift with a side push-back

The instructor stands at the side of the mono-ski, with skis pointed in the lift direction, hips and shoulders turned slightly toward the mono-ski and chair. The lift operator stands on the other side and at 90 degrees to the lift direction. The instructor and the lift operator grasp the side handles and lift up. The instructor pulls back while the lift operator pushes back.



Adaptive Mono-Ski Progression

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

Beginner / Novice Zone Objectives

Level 1: Welcome to Skiing / Build the Foundation

- Student assessment
- Medical history
- Equipment selection, introduction and set up (including dowel test, seating position, pelvic tilt and leg symmetry)
- Static balance exercises, indoors
- Student/instructor communication, safety and emergency stop

Level 2: Introduction to Flats

- Pushing, turning, pivoting on flats
- Static balance exercises, outdoors on flats
- Falling and getting up
- Straight runs
- Outrigger and body position while moving
- Stopping and slowing
- Introduction to chairlift and beginner terrain
- Chairlift loading and unloading procedures
- Review lift evacuation procedures
- Student assisted/instructor assisted chairlift load & unload
- Outrigger position and timing during loading and unloading

Level 3: Introduction to Turning

- Turning left and right through balance and rotary movements
- Vary turn shape and size
- Speed control
- Turning to a stop
- Fan progression
- Linked turns
- Slipping/ sliding/ skidding
- Master beginner area
- Develop greater skill blending
- Hockey stops for mono-skis

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
- Proper outrigger movements (outrigger lead change)
- Refine proper body movement and position
- Develop long to medium and medium to long radius turns
- Edge control exercises for mono-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 angulation
- Independent lift loading and unloading
- Bump skiing on easy blue terrain

Level 7: Exploring Movements and Skills for Upper Level Skiing
- Short radius turns
- Explore carving sensations
- Spinal cord extension at turn initiation
- Total independence
- Rebound turns for mono-skis

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