



Revision 10-25-13

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



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Local regulations and safety guidelines take precedence over this information. It is in your best interest to exercise due diligence in determining the appropriateness of the information for your particular circumstances. In addition, please take into account any and all factors that may affect your lesson. This includes but is not limited to: the health, well-being and fitness of the student; weather conditions; terrain; other people on the slope; your own abilities, as well as those of your student and anyone who may accompany you.

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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.

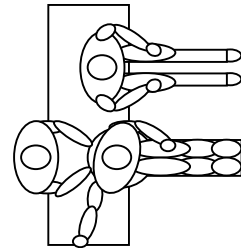
Lift Loading Assists

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:

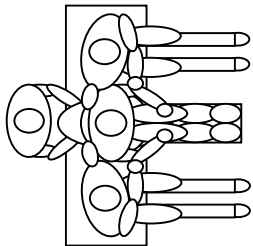
- Always lift with the back straight, in a wide stance and using the legs and biceps.
- Make sure proper communication has occurred between the student, lead instructor, assistant instructor and lift operator.
- There are four assists that may be use with mono-skis: a) pull-back, b) lift and pull-back, 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

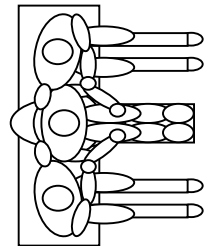
The lift operator reaches over the chair, grasps the handle on the back of the mono-ski and pulls it back onto the chair. This is usually used for fairly independent mono-skiers.



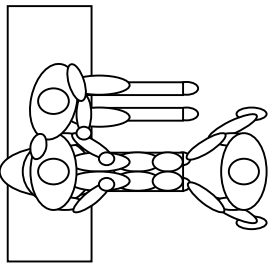
b) Lift and pull-back



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.



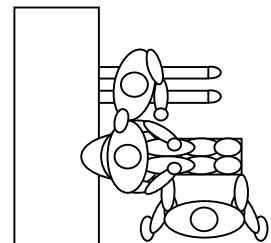
c) Lift with a front push-back



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 Objectives

The following is based on the [PSIA Adult Alpine Teaching Handbook](#) and has been adapted for mono-skiing. Local regulations and safety guidelines take precedence over this information. It is in your best interest to exercise due diligence in determining the appropriateness of the information for your particular circumstances. In addition, please take into account any and all factors that may affect your lesson. This includes but is not limited to: the health, well-being and fitness of the student; weather conditions; terrain; other people on the slope; your own abilities, as well as those of your student and anyone who may accompany you.

Beginner / Novice Zone Objectives

Level 1: Welcome to skiing / Build the foundation

- Perform **student assessment**.
- Discuss **medical history**.
- Determine and share **goals**.
- Select, introduce and set up **equipment**.
- Agree on student / instructor **communication and safety**.
- Perform **static balance exercises** and develop **athletic stance**, indoors.
- Perform **pushing, turning, pivoting and balancing drills** on flats.
- **Begin** to understand the **fall line** and **terrain changes**.
- Learn how to safely **fall and get up**.
- Learn to **slide** at slow speed.
- **Glide and slide across the slope**.
- Perform a **straight run** to a terrain-assisted stop.
- Develop effective **outrigger and body position while moving**.

Level 2: Introduction to Turning

*Note: Turning at this level is achieved through **balance and rotary skills**.*

- Develop **stopping and slowing** skills.
- **Turn left and right to a stop**.
- Perform **linked turns**.
- Begin to **vary shape and size of turns**.
- Develop effective **outrigger and body position for turning**.
- Perform **outrigger-equivalent braking wedge**.
- Learn how to **ride chairlift**.
- Review **lift evacuation procedures**.
- Learn safe **outrigger position and timing** while **loading and unloading**.
- Introduce **sideslip** skills in the beginner area.

Level 3: Introduction to Green Terrain

- **Explore terrain** – go for lots of quality mileage!
- Actively **skid** the skis for turn shape and speed control.
- **Begin** to use terrain-assisted **edging and edge release movements** to initiate a turn.

Intermediate Zone Objectives

Level 4: Mastering Green Terrain

- Refine the ability to control the skis by **turning and tipping** the appropriate body parts.
- Perform **edge control** exercises.
- Explore **all green terrain in a variety of snow conditions**.
- Experiment with **turn shape and size**.
- Develop an understanding of **how changes in stance affect the skis**.
- Solidify a **release move to initiate a turn**.
- Use **hockey stops**.

Level 5: Developing Skills to Enhance Parallel Skiing

- Use **independent outrigger action**.
- Improve **dynamic balance**, increase **range of motion**, and feel the **edges**.
- Gain an understanding of **upper and lower body independence**.
- Develop **simultaneous edge release for parallel turns** on blue terrain.
- **Control speed** on green and groomed blue **terrain by blending skills and using tactics and turn shape**.
- Develop **long- to medium- and medium- to long-radius turns**.
- Ski a **“green line” in the bumps**.
- Freestyle: Learn how to **jump**, using **natural terrain features** and **beginner terrain parks**.

Level 6: Anchor Parallel Skiing & Learning Tactics for bumps and Variable Conditions on Blue Terrain

- **Link open parallel turns** with emphasis on **simultaneous rotation** and **edging**.
- Perform **medium- to short-radius turns**.
- Ski **varying snow conditions**.
- **Carve uphill arcs**.
- **Refine tipping movements** to become more dynamic.
- Perform **short-radius turns while developing upper and lower body independence**.
- Create body **angulation**.
- Explore using **skidded and carved short turns as tactics for speed control on steeper terrain**.
- Explore **powder, crud and cut-up snow** conditions.
- Ski a **“blue line” in the bumps**.
- **Load and unload** on lift **independently**.
- Develop **total independence**.
- Freestyle: **Straight slide a funbox**.

Advanced Zone Objectives

Level 7: Linking Parallel Turns on All Blue and Some Black Terrain, and Increasing Confidence in Variable Terrain and Conditions

- Perform carved **railroad track turns**.
- Perform **rebound turns**.
- Continue to **refine skill blending** for parallel turns on all blue and some black terrain.
- Explore a **variety of turn shapes** on groomed and variable terrain
- Explore **tactics** for skiing all terrains.
- Freestyle: **Ski switch**.
- Freestyle: **Land switch off a jump**.
- Freestyle: **Perform a rail slide** on a bamboo pole or PVC practice rail.

Level 8: Mastering the Mountain and Exploring the Latest Ski Designs

- Continue to enhance **upper and lower body separation**.
- **Carve medium- and long-radius turns**.
- **Refine edge engagement and release movements**, changing line, turn shape, and speed to adapt to challenging terrain and snow conditions.
- **Refine flexion and extension movements** to maintain balance, manage uneven terrain, and allow the efficient blending of all other movements.
- **Perform short-radius turns using upper and lower body independence** in variable conditions to develop more speed control and manage terrain more efficiently.
- Ski the **“black line” in the bumps**.
- Become comfortable skiing all of the mountain’s **most difficult terrain**.
- Freestyle: **Introduce the halfpipe**.
- Freestyle: **Perform a rail slide on a funbox**.

Level 9: Skiing Any Turn, Anytime, Anywhere in Any Snow Condition

- Increase confidence in **ski design and speed** in a safe environment (especially useful for the skier interested in racing).
- **Refine flexion and extension movements** to enhance turn mechanics.
- **Use timing and tempo to enhance the release of the old edges**, tipping both skis simultaneously from turn to turn while reducing anxiety and fatigue to allow for more enjoyable skiing on challenging terrain.
- **Refine movements and options in short-radius turns**, adjusting tactics at will.
- Explore **alternative movement blends and tactics** for variable conditions, **skiing the entire mountain efficiently**.
- Freestyle: **Perform a 360 off a jump**.
- Freestyle: **Perform a rail slide on a metal rail**.