PSIA AASI
NORTHWEST

MONO-SKI

Exam Information

Revised 2011

Mono-Ski EXAM INFO

Mono skis are specialized adaptive equipment designed for students with significant problems standing and balancing while in motion. These problems could be caused by physical trauma or neurological muscular impairments.

Types of disabilities common to mono skiers:

- Amputation
- Neuromuscular diseases
- Brain Trauma
- Post Polio
- Cerebral Palsy (CP)
- Dwarfism
- Spinal cord injuries (SCI) spastic, athetoid, flaccid, ataxic, rigid
- Paraplegia, incomplete quadriplegia
- Muscular dystrophy (MD)
- Multiple Sclerosis (MS)
- Spina Bifida
- Severe balance impairments
- Severe epilepsy
- Stroke
- Cancer
- Friedreich's Ataxia

In addition, there are some skiers who have progressive or degenerative types of disability. 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.

Evaluation

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 evaluation 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.

However, 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 obtain from the student, parent or guardian along with the information provided in the student's application or evaluation. Some medical concerns associated with mono 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 impeding 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.

The majority of the skiers who use a mono-ski have spinal cord injuries, double leg amputation, muscular dystrophy, multiple sclerosis, 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 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 for the participant.

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.

The mono-skier must also be properly balanced. This is achieved primarily through a thorough set up process. After all seating system adjustments have been completed,

padding, frame length, trunk support and the outriggers are sized appropriately, a dowel test can be done to help determine where the mono-ski should be placed relative to the center of the snow ski to best take advantage of the frame / ski set up for best on-snow performance.

1. With the student seated in the mono-ski, in the skiing position, with outriggers, helmet, boots, etc., place the dowel under the mono-ski, with the snow ski attached.

2. Align the dowel directly beneath the center mark on the snow ski. The center mark is the manufacturer's designed center of the ski, where the snow ski will perform at it's best.

3. Position the student and skier so that they are balanced on the dowel. (A section of wood closet rod 1.5" in diameter works well.) The student should be able to tip fore and aft with minimal movement of their head, while maintaining a good functional mono-skiing stance. If they can not balance move the dowel slightly forward or back as necessary to find the balance point.

4. The point where the student balances, directly above the dowel, is roughly their center of mass. Mark this point on the frame of the mono-ski where it interfaces with the snow ski.

5. Align the mark on the frame over the ski boot center mark on the snow ski. This is a reasonably good place to begin for an entry level skier and take best advantage of the technical ski design. Alignment of the student slightly forward of the center will facilitate easier turn initiation and shorter radius turns. Aligning the dowel behind the center of the ski will create a more carved, longer radius turn. The 'dowel' center can be adjusted to assist the skier in more easily accomplishing their goals in turning.

6. Remember, adaptive skiing is full of variables, such as individual student needs, different types of mono-skis, etc. Careful on snow observation, good knowledge of the equipment and sound fundamental teaching techniques combined develop a properly balanced mono-skier. 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 their 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 was a mechanical issue.

Lift Loading Procedures – General Overview

The following are general procedures for an instructor assisted chair loading and unloading of mono 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.

• Once on the chair lift, first put safeties bar down and then attach safety strap and carabineer 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 carabineer and strap once you have passed the final lift tower before the unloading platform. Do not lift the safety bar until the chair is over the netting of the unloading ramp. Make sure all straps, clothing, outriggers are free of the chair and do not hinder a clean unload.

• 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 mono 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 mono ski lift evacuation is termed a double carabineer with opposing gates. Evacuation carabineers 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: a) pull back from the back of the chair, b) lift and push back from the foot rest, c) side lift and push back.

a) 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.

b) Volunteer Assistant or Lift Operator grasps the foot rest 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 mono 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.

c) 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.

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 Chair Lift and beginner 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

Level 3: Introduction to Turning

Turning left and right through balance & 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

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