



# ADAPTIVE ENCYCLOPEDIA

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*Local and program 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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**This information is a general overview of common physical and cognitive disabilities found in students that may be skiing or snowboarding in adaptive programs. In all cases, ask questions to learn as much as you can about the individual and his/her disability. Each student is unique and is affected differently by his/her disability.**

In general, you should be aware of the following:

- Avoid contact with your student if you are ill because many diseases and disabilities, as well as their treatments, may compromise the student's immune system.
- Be aware that the strenuous exercise, altitude and extreme weather involved in skiing and snowboarding may cause side effects that the student has never before experienced.
- If the student has a progressive or relapsing disease, remember to recheck the level of ability often, as it can change.
- Since many diseases and disabilities can impact a student's energy level, pace the lesson accordingly and check with the student often to avoid exhaustion.

# RESOURCES

This document is provided for reference as you prepare for your PSIA-RM-AASI exams. For details about which disabilities and medications you are expected to know for your particular exam, see the Level 1 & 2 and Level 3 Exam Materials.

Included in this document is general information about disabilities, diseases and medicines you may encounter in your adaptive ski or snowboard students, as well as adaptive techniques that may be used for those students. Since the information is summary in nature, you may need to do more research for specific adaptive students and in preparation for your exam. Here are some additional resources that can provide more detailed information:

Professional Ski Instructors of America & American Association of Snowboard Instructors. *Adaptive Snowsports Instruction*. Lakewood, CO: The Professional Ski Instructors of America Education Foundation, 2003.

Hal O'Leary, PSIA, NHS. *Bold Tracks: Teaching Adaptive Skiing, Third Edition*. Boulder, CO: Johnson Books, 1994.

Professional Ski Instructors of America and American Association of Snowboard Instructors. *Children's Instruction Manual, Second Edition*. The Professional Ski Instructors of America Education Foundation, 2008.

Professional Ski Instructors of America & American Association of Snowboard Instructors. *Core Concepts for Snowsports Instructors*. The Professional Ski Instructors of America Education Foundation, 2001.

Centers for Disease Control and Prevention: [www.cdc.gov](http://www.cdc.gov)

Eunice Kennedy Shriver National Institute of Child Health & Human Development: [www.nichd.nih.gov](http://www.nichd.nih.gov)

Healthline: [www.healthline.com](http://www.healthline.com)

March of Dimes Fact Sheets: <http://www.marchofdimes.com/professionals/14332.asp>

Mayo Clinic: [www.mayoclinic.com](http://www.mayoclinic.com)

MedlinePlus (a service of the U.S. National Library of Medicine): [www.nlm.nih.gov/medlineplus](http://www.nlm.nih.gov/medlineplus)

National Center on Birth Defects and Developmental Disabilities: [www.cdc.gov/ncbddd/index.html](http://www.cdc.gov/ncbddd/index.html)

National Institutes of Health: [www.nih.gov](http://www.nih.gov)

National Institute of Mental Health: [www.nimh.nih.gov/index.shtml](http://www.nimh.nih.gov/index.shtml)

National Institute of Neurological Disorders and Stroke: [www.ninds.nih.gov](http://www.ninds.nih.gov)

# DIAGNOSIS

**ALBINISM:** A genetic defect in which melanin production is inhibited, resulting in little or no color (pigment) in the skin, hair and eyes. May cause vision problems and light sensitivity. Be sure to perform a vision test during your student assessment. Protective clothing, sunscreen and eyeglasses or goggles are critical.

**ALZHEIMER'S DISEASE (AD):** A progressive, degenerative brain disease that destroys a person's ability to remember, reason, learn and imagine. Simplify instructions and be aware that the student with AD may not be able to formulate questions or express his/her confusion. Remind the student to eat and drink to avoid dehydration.

*For more information: Alzheimer's Association ([www.alz.org](http://www.alz.org)).*

**AMPUTATIONS:** Removal of body part, usually a leg or arm.

**AE:** Above elbow.

**AK:** Above knee - usually skis without prosthesis.

**BE:** Below elbow.

**Bilateral:** Amputations on both sides. This can include: amputation of both legs, amputation of both arms, amputation of an arm on one side and leg on the other. (Arm and leg amputees usually ski on one ski with one outrigger).

**BK:** Below knee – Generally, if the stump is four inches or longer and the skin is in good condition, the individual may ski with prosthesis.

**Hemipelvectomy:** Amputation of half of the pelvis and the associated leg.

**Hip disarticulation:** Amputation at the hip joint (this preserves the pelvis and the soft tissue to the buttocks); usually skis without prosthesis

**Shoulder disarticulation:** amputation below the shoulder socket.

**Syme's:** Amputation at the ankle.

**HP:** Hemipelvectomy - The most severe level of amputation. This amputation includes half of the pelvis and the limb leaving, only the soft tissue of the buttocks.

**Shoulder disarticulation:** Amputation at the shoulder joint.

**Unilateral:** Amputations on the same side. Although obtaining and maintaining dynamic balance when skiing is difficult, unilateral amputees do ski. (e.g., a unilateral BK/BE could ski on both skis with one outrigger).

Look for the cause of the amputation. If due to cancer chemotherapy may cause fatigue or impaired temperature control. If amputation is due to diabetes, the individual may lack sensation in other areas (often hands or feet); they may need to eat or take medication on a certain schedule. (Some diabetics also have low vision or blindness.) Injuries resulting in amputation may encompass other hidden disabilities for example, minimal brain damage, need for a bladder control device, or hearing impairment. The residual limb (stump) needs to be protected while skiing. An ace wrap should be applied to prevent swelling and/or the limb should be padded and covered to avoid damage from falls or cold. Skiing with a prosthesis is determined by the length of the residual limb plus advice from a prosthetist to be sure it is strong enough to withstand the stresses of skiing. If the student's prosthesis includes a hook, make sure it is covered to prevent injury. Be aware that falls can cause internal or external bleeding for those using a blood thinner.

**AMYOTROPHIC LATERAL SCLEROSIS (ALS / LOU GEHRIG'S DISEASE):** A neurological disease in which the neurons waste away or die, causing muscle weakness, disability and eventually death. Be aware that altitude, exercise and dry air can aggravate some symptoms.

*For more information: ALS Association ([www.alsa.org](http://www.alsa.org)).*

**APHASIA:** Language disorder caused by damage to the brain and resulting in an inability to communicate effectively. Someone with **Receptive Aphasia** has difficulty understanding or producing any form of language; what is read or heard may be meaningless. Those with **Expressive Aphasia** often cannot express a complete thought. When communicating to people with aphasia, use simple sentences and questions. Using gestures as well as words may also be helpful.

**APRAXIA:** A disorder of the nervous system in which the individual is unable to perform tasks or movements already learned, even though the muscles and senses work properly.

**ARTHRITIS:** A chronic inflammatory disease of the joints as well as other parts of the body which causes pain and loss of movement.

**Ankylosing Spondylitis:** Chronic inflammation of the joints between the vertebrae of the spine and the joints between the spine and the pelvis. May cause inflammation and pain in other parts of the body as well. May eventually cause the affected spinal bones to fuse together.

**Juvenile:** A general term which is used to define any arthritis which affects children.

**Osteoarthritis:** Degenerative disease which causes inflammation of one or more joints due to the breakdown of cartilage. The most common form of arthritis.

**Rheumatoid:** A chronic autoimmune disease that causes inflammation of the joints and surrounding tissues. May also affect organs and other parts of the body. Includes periods of increased disease activity (called flare-ups or flares) alternating with periods of relative remission.

Choose appropriate terrain to minimize impact on joints. Avoid excessive repetitive motions and don't overwork a damaged or sore joint.

*For more information: Arthritis Foundation ([www.arthritis.org](http://www.arthritis.org))*

**ARTHROGRYPOSIS (ARTHROGRYPOSIS MULTIPLEX CONGENITAL / AMC):** A group of rare congenital disorders characterized by multiple joint contractures (stiffness of the joints that prevents full extension). May include muscle weakness and fibrosis (excessive collagen in an organ or tissue). Sensation is usually intact but deep tendon reflexes may be diminished or absent. Ensure that a doctor's permission has been received before skiing/boarding, since some movements can further aggravate the condition.

**ASTHMA (BRONCHIAL ASTHMA):** A chronic lung disease that may cause coughing, wheezing, difficulty breathing and tightness in the chest. Be aware that an asthma attack may be triggered by a number of things commonly encountered by an adaptive ski/snowboard student, including: changes in weather (especially cold air); respiratory infections; stress and strong emotions; certain medications; and exercise and physical activity.

**ATTENTION-DEFICIT/HYPERACTIVITY DISORDER (ADHD):** Also called Attention Deficit Disorder (ADD). A neurobehavioral developmental disorder featuring a persistent pattern of inattention, impulsivity and hyperactivity. More common in children but may appear in teenagers and adults as well. Try to limit distracting stimuli; give one direction at a time; try to maintain eye contact; avoid complex instructions; and be clear and concise. Since people with ADHD may be easily frustrated, maintain a calm attitude. Individuals who have ADHD often have normal to above normal intelligence.

**AUTISM SPECTRUM DISORDER (PERVASIVE DEVELOPMENTAL DISORDER):** A group of developmental disorders with a range of severity that can affect social interaction, communication and repetitive behaviors or interests. Often characterized by impaired communication, extreme self absorption, being detached from reality, destructive behavior, and resisting physical or eye contact. The most common types are:

**Asperger's Syndrome:** the mildest form, marked by obsessive interest in an extremely narrow range of topics, impaired social skills and often a lack of physical coordination.

**PDD-NOS:** Pervasive Developmental Disorder, Not Otherwise Specified. Applies to most people with ASD. Impaired social interaction and language skills. Fewer repetitive behaviors than Asperger's Syndrome or Autistic Disorder.

**Autistic Disorder:** More severe impairments involving social and language functioning. Repetitive behaviors. Often includes intellectual disability (mental retardation) and seizures.

**Childhood Disintegrative Disorder (CDD):** Most severe and least common. After a period of normal development (usually 2-4 years), child rapidly loses social and language skills and intellectual abilities. Lost function is not recovered. Often includes a seizure disorder.

Recent studies indicate that some individuals previously diagnosed with autism may suffer from chromosome damage (i.e., Fragile X Syndrome).

*For more information: Autism Society ([www.autism-society.org](http://www.autism-society.org)); Autism Speaks ([www.autismspeaks.org](http://www.autismspeaks.org)).*

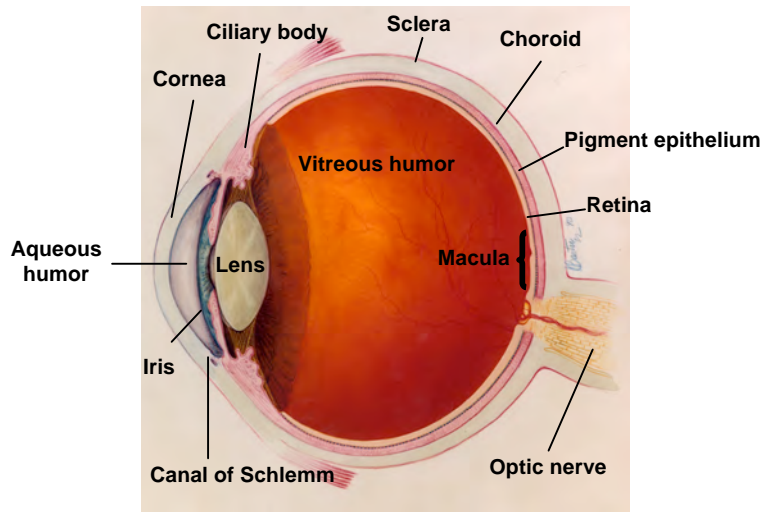
**BALANCE IMPAIRMENTS:** Inability to maintain stability while standing, sitting or moving. May be caused by normal aging or any disease or trauma that impairs sensory processing, neuromuscular response, musculoskeletal function or cognition. Other common causes are hemiplegia or hemiparesis; Meniere's disease; and injury to the central nervous system. Allow extra distance between the student and obstacles, since lack of balance can also impair reaction time.

## **BLIND / VISUALLY IMPAIRED:**

Partial or total loss of vision, which may include, but not be limited to: tunnel vision, peripheral vision, myopia, or loss of depth or distance perception. Some causes include: Diabetes, Glaucoma, Detached Retina, Eye Injury, Multiple Sclerosis, Brain Tumor or Head Injury.

Ask specific questions and define the students' acuity, range of vision, depth perception and ability to perceive colors. Be sure to test both inside and outside as changing light conditions may have an impact on the vision. As a general rule for all visual impairments, allow extra

distance between the student and any obstacles as the visual impairment may affect response time. Ensure the student is using appropriate eyewear to protect from ultraviolet light. Use goggles when skiing rugged terrain to prevent eye trauma from rocks or chunks of ice.



*Image courtesy of: National Eye Institute, National Institutes of Health*

**Amblyopia (Lazy Eye)** A condition that occurs when the brain favors one eye over the other. The preferred eye has normal vision, but because the brain ignores the other eye, it does not develop normally. Left untreated, the visual deficit in the ignored eye may become permanent. The person with amblyopia may exhibit crossed eyes; eyes that don't move together; and impaired depth perception. The most common cause of vision problems in children.

**Cataracts:** Clouding of the lens causing partial or total blindness. Often removed with surgery, which restores some vision.

**Detached Retina:** A painless condition in which retinal layers split and space fills with fluid. Usually caused by trauma. Symptoms depend on the location and extent of the detachment. May cause blindness or visual problems; eye floaters; hazy vision; loss of peripheral vision or loss of vision in one half of the visual field; perceived flashes of light. Central vision may become severely affected if the macula becomes detached.

**Diabetic Retinopathy:** A non-inflammatory retinal disorder that result from interference with the blood supply to the eyes. May cause blurred vision; floaters; shadows or missing area of vision; and blindness. A leading cause of acquired adult blindness.

**Diplopia (double vision):** The simultaneous view of two images of a single object. May occur in one or both eyes. Seen in diseases of the eyeballs, cranial nerve affections, and disease of the cerebellum, cerebrum, and meninges.

**Glaucoma:** A group of disorders characterized by high pressure within the eye. Leads to progressive damage of the optic nerve. May cause decreased or cloudy vision; sensitivity to light; loss of peripheral vision. One of the leading causes of blindness in the U.S.

**Hemianopia:** loss of vision in either or both eyes, commonly caused by a CVA or brain injury.

**Hyperopia:** Visual defect in which near objects appear blurred.



**Macular Degeneration:** A progressive disease that causes deterioration of the macula. This leads to vision impairment in the center of the field of vision, including blurred, distorted or dim vision or loss of vision (not usually complete blindness). More common in the elderly but it can occur at any age. Laser therapy can sometimes halt progress.

**Myopia:** Visual defects in which distant objects appear blurred.

**Nystagmus:** Rapid, involuntary movement of the eyeball due to abnormal function in the areas of the brain that control eye movements. Eye movement can be side to side, up and down or rotary. May occur in one or both eyes.

**Ophthalmoplegia:** Paralysis or weakness of ocular muscles which may cause double vision, nystagmus or muscular problems in the face.

**Retinitis Pigmentosa:** A group of genetic eye conditions that cause progressive destruction of the light receptors in both eyes. The rods (for black and white vision) are affected most, usually resulting in night blindness. This also leads to tunnel vision and in rare cases, complete blindness.

**Strabismus:** Imbalance in the eyes due to unequal strength of the extraocular eye muscles. May present as **Exotropia** (eye turns away from the nose – walleye); **Esotropia** (eye turns toward the nose – cross-eye); **Hypotropia** (the line of vision of one eye turns more downward than the other) or **Hypertropia** (the line of vision of one eye turns more upward than the other).

*For more information: National Eye Institute ([www.nei.nih.gov](http://www.nei.nih.gov))*

**BURNS:** Injury resulting from excessive exposure to heat, sun, caustics, electricity or radiation. Depending on the level of the burn and the success of the recovery, damage may be caused to skin, deep tissue, joints, bones or airways. There are three levels of burns:

**First-degree burns** are mild and characterized by heat, pain and reddening but no blistering or charring of tissues.

**Second-degree (partial thickness) burns** affect both the outer and underlying layer of skin, causing pain, redness, swelling, and blistering.

**Third-degree (full thickness) burns** are severe and extend into deeper tissues. They cause white or blackened charred skin that may be numb.

The burns may impact your student's thermoregulation, so he/she may not recognize when he/she is getting cold. Ironically, the scars insulate the body's own heat, making the student susceptible to heat exhaustion as well. People recovering from burns have a high risk of sunburn and windburn but the chemicals in sunscreens with an SPF higher than 15 may also burn the skin, so encourage your student to use a low SPF sunscreen and reapply often. Areas of skin grafts may be missing a sense of touch, making the student vulnerable to unnoticed blisters around pressure points like boots. Also, since the skin grafts are often taken from the buttocks, your student may experience a sore butt, especially if he/she sits for long periods of time.

**CANCER:** Uncontrolled growth of abnormal (malignant) cells in the body. Also called carcinoma or malignant tumor. Cancer is categorized in stages:

- 0:** abnormal cells are found only in the first layer of cells of the primary site and do not invade the deeper tissues
- I:** cancer involves the primary site but has not spread to nearby tissue
- II:** cancer has spread to nearby areas but is still inside the primary site
- III:** cancer has spread throughout the nearby area
- IV:** cancer has spread to other parts of the body
- Recurrent:** cancer has come back after it has been treated

*For more information: National Cancer Institute ([www.cancer.gov](http://www.cancer.gov)); American Cancer Society ([www.cancer.org](http://www.cancer.org)).*

**CEREBRAL PALSY:** A non-progressive disorder caused by brain damage before, during or after birth. It is characterized by abnormalities of muscle tone and difficulties with voluntary motor control. It usually results in delayed motor development. The individual may have one type or a mixture of types. Individuals with cerebral palsy may or may not have cognitive impairment. Medical associations and text varies as to types and numbers of classifications. Listed below are common definitions of CP classifications:

**Spastic:** Increased muscle tension and difficulty with relaxation, may lack full mobility at some joints. *Tense contracted muscles.*

**Athetoid:** May also be called **Dyskinetic**. Muscle tone fluctuates from high to low therefore motor control is inconsistent. *Extraneous, uncontrolled movements.*

**Ataxic:** Muscle tension often appears okay but control of movement and balance is impaired so that the individual may exhibit a lurching gait. *Jerky, uncontrolled movements.*

**Mixed CP:** A combination of CP type.

*For more information: United Cerebral Palsy ([www.ucp.org](http://www.ucp.org)).*

**CEREBROVASCULAR ACCIDENT (CVA) / STROKE:** Sudden impairment of cerebral circulation in one or more of the blood vessels supplying the brain, which interrupts or diminishes oxygen supply and commonly causes serious brain damage. Location of the injury in the brain determines type of symptoms, where the symptoms are expressed and the severity of the disability. Individuals may suffer from hemiplegia (one sided paralysis) of either upper or lower extremities or both. Balance may also be an issue. Some stroke victims have difficulty speaking or processing auditory input. Other complications include aversion to the affected side of the body; visual deficits; risk of additional strokes; emotional and psychosocial behavior; and long-term or short-term memory loss.



### **CHARCOT-MARIE-TOOTH DISEASE (PERONIAL MUSCULAR ATROPHY**

**DISEASE):** One of the most common inherited nerve-related disorders. Involves damage to the covering (myelin sheath) around nerve fibers, which eventually causes weaker messages travelling between the extremities and the brain. Afflicts the peroneal muscles along the outer side of the lower leg that control pronation and plantar flexion of the foot. Check the fit of the student's boot carefully, since he/she may not be able to feel pressure points.

*For more information: Charcot-Marie-Tooth Association (<http://www.charcot-marie-tooth.org/>).*

**COGNITIVE DISABILITY:** Damage to, or deterioration of, any portion of the brain that affects the ability to process information, coordinate and control the body or move in space. Two classifications:

**Organic:** related to diseases, such as Alzheimer's, Parkinson's, brain tumors or cerebrovascular diseases

**Non-organic:** caused by injury or trauma, such as a traumatic brain injury

**CONGENITAL ANOMALIES OF HIP/LEG/FOOT:** Abnormalities acquired during development in the uterus and not through heredity. Depending on the location and the specific anomaly, may impact basic muscular functions, such as abduction, adduction, approximation, flexion, extension, dorsiflexion, plantar flexion, eversion, inversion, pronation and supination. May also affect the skeletal structure of the hip, leg or foot, causing issues such as dislocation, subluxation (partial dislocation), torsion (twisting) or rigidity.

*For more information on basic human anatomy and how it is used in skiing, see the PSIA Core Concepts Manual.*

**CYSTIC FIBROSIS (CF):** Inherited disease in which thick sticky mucus builds up in the lungs and the digestive tract, especially in the pancreas, which breaks down food. This mucus results in life-threatening lung infections and serious digestive problems. Lungs may be irritated by cold, dry air and high altitude. Remind a student with CF to drink plenty of liquids to help loosen the mucus.

*For more information: Cystic Fibrosis Foundation ([www.cff.org](http://www.cff.org)).*

**DEAF & HARD OF HEARING:** Total or partial inability to hear sound in one (unilateral) or both (bilateral) ears. May also be accompanied by some loss in the ability to correctly interpret auditory stimuli even after amplification. Some frequencies of sound may be muffled or not heard at all. The deaf & hard of hearing population is often noted as being the largest of all chronic physical disabilities. Hearing loss occurring after 19 years generally does not affect speech. Hearing losses occurring from birth to three years are referred to as *prelingual deafness*. Deafness occurring from three years to 19 years is termed as *prevocational deafness*. Hearing Impairments fall into three categories:

**Conductive hearing loss (CHL):** Mechanical problem in the outer or middle ear

**Sensorineural hearing loss (SNHL):** Problem with the inner ear

**Mixed hearing loss:** combination of CHL & SNHL

Don't assume that a hearing aid corrects hearing loss completely. Get your student's attention before speaking. It is acceptable to do so with a tap on the shoulder or a wave of your hand. Face your student and maintain eye contact throughout the conversation. Try to converse in a quiet place; avoid getting too close to chairlifts or crowds. Confirm that your student understands you and is not just nodding politely.

*For more information: National Institute on Deafness and Other Communication Disorders ([www.nidcd.nih.gov](http://www.nidcd.nih.gov))*

**DEVELOPMENTAL DELAYS:** A lag in learning and mastering developmental milestones beyond the time period experienced by most children. May be caused by genetic abnormality (e.g., Down Syndrome); exposure to toxins before or after birth (e.g., lead or drugs); poor nutrition for the mother during pregnancy or for the child after birth; infections passed from mother to baby during pregnancy (e.g., measles); severe poverty; lack of nurturing. May impact one or more area of development: cognitive; social and emotional; speech and language; fine motor skills; gross motor skills.

*For more information about childhood development and PSIA's cognitive/affective/physical model (CAP), see the PSIA Children's Instruction Manual.*

**DEVELOPMENTAL DISABILITY:** A condition resulting from congenital abnormalities, trauma, disease or deprivation which interrupts or delays normal fetal, infantile or juvenile growth and development. Onset occurs before age 18 and it then continues throughout the remaining lifespan. Common developmental disabilities are intellectual disability (mental retardation); cerebral palsy; autism spectrum disorders; epilepsy/seizure disorders; and Down syndrome.

**DIABETES:** A disease in which the body cannot properly process sugar (carbohydrates). This is caused by the inability of the pancreas to produce enough insulin to meet the body's needs. There are three main types of diabetes:

**Type 1:** (Formerly Juvenile Diabetes) The body's immune system has attacked and destroyed the specialized pancreatic cells that produce insulin, so the pancreas is unable to manufacture enough insulin to properly control blood sugar levels.

**Type 2:** (Formerly Adult-Onset Diabetes) The body becomes insulin resistant (muscles, liver and fat cells do not use insulin properly and the body needs more insulin). Eventually the pancreas cannot keep up with the higher demand for insulin.

**Gestational Diabetes:** Diabetes which first occurs during pregnancy, when a woman's need for insulin seems to increase. Usually goes away after the baby is born, although it leaves the woman more susceptible to Type 2 diabetes in the future.

Two possible concerns with diabetes are:

**Hyperglycemia:** Not enough insulin. This usually occurs over a few hours or days.

**Hypoglycemia:** Not enough sugar. Hypoglycemia is a major concern, as it can be triggered by unusual exercise (skiing), delays in meals, or too much insulin. Sugar is needed immediately if it occurs.

*For more information: National Institute of Diabetes and Digestive and Kidney Diseases ([www2.niddk.nih.gov](http://www2.niddk.nih.gov))*

**DOWN SYNDROME (TRISOMY 21):** A birth defect, which causes mental retardation. Down syndrome is caused by an extra chromosome at fertilization, usually chromosome #21. Often have loose joints and low muscle tone. Additionally, there may be a predisposition for cervical subluxation, whereby a cervical vertebra dislocates and can cause a spinal cord compression. This can easily be detected by X-Ray. Surgical repair may be necessary to prevent injury. Heart and gastro-intestinal problems may also be present, as well as hypothyroidism. Higher than average risk of developing leukemia and Alzheimer's disease.

*For more information: Down Syndrome: Health Issues ([www.ds-health.com](http://www.ds-health.com)); National Down Syndrome Society ([www.ndss.org](http://www.ndss.org)).*

**DWARFISM:** Term applied to a range of conditions resulting in unusually short stature. A person with dwarfism may have body proportions that differ from a child, even though he/she has the height of a child.

**DYSLEXIA (DEVELOPMENTAL READING DISORDER / DRD):** A reading disability resulting from the brain's inability to recognize and process graphic symbols. Most people with DRD have normal intelligence and many have above-average intelligence. May have difficulty recognizing written words, rhyming or understanding sentences. May also cause directional confusion, trouble with tying shoes or a delay in speech development. Directional confusion may take a number of forms, all of which can have an impact on how you structure the ski lesson: uncertainty of left and right; difficulty reading a map; inability to understand up and down or top and bottom; problems keeping one's place when playing games; inability to mirror an instructor's movements when facing each other.

*For more information: The International Dyslexia Association ([www.interdys.org](http://www.interdys.org)).*

**DYSARTHRIA**: A motor speech disorder that results in difficulty articulating words. It can appear as slurred speech; slow rate of speech; quiet speech; mumbling; garbled speech; limited tongue, lip and jaw movement; abnormal intonation (rhythm) when speaking; or changes in vocal quality. Caused by disease or trauma to the brain. Since it may only affect some words, if you are having difficulty understanding a student, ask him/her to repeat using different words. It may also be helpful to ask yes/no questions, which can be answered with simple head movements instead of speech.

*For more information: American Speech-Language-Hearing Association ([www.asha.org](http://www.asha.org)).*

**EMOTIONAL BEHAVIOR DISABILITY (EBD)**: A broad, loosely defined category commonly used in educational settings to describe social, emotional or behavioral functioning that departs from generally accepted, age-appropriate ethnic or cultural norms. To be considered an emotional behavior disability, the inappropriate behavior must be severe, chronic and frequent and not the result of situational anxiety, stress or conflict. It must also occur at school and in at least one other setting. Provide the student with a structured routine that includes specific times for activities. Alter the student to any changes of routine as soon as possible. Reward more than punish and when punishing, provide immediate, logical, pre-established and consistent consequences for unacceptable behavior. When possible, allow the student to work one-on-one with an instructor so that distractions are diminished. Use time-outs to allow the student to cool off disruptive behavior.

**EPILEPSY / SEIZURE DISORDER**: A disorder that disrupts the transmission of electrical signals inside the brain. Most seizure disorders are controlled by medication. If a seizure occurs, try to protect student from injury. Discontinue skiing as the individual may be disoriented and/or physically or mentally fatigued.

Seizures may consist of a brief suspension of activity where an individual stares into space or may be generalized, with full body involvement. There are many types of seizures that range in symptoms, severity and length. Below are the most common categorizations:

**Tonic-Clonic (grand mal)**: Seizures are generalized and affect the entire brain. An aura (strange feeling, taste, vision or smell) may indicate the start of a seizure. The seizure proceeds with loss of consciousness and movements alternating between contraction and relaxation of the muscles. Incontinence may occur. Seizures may last from seconds to minutes.

**Absence seizure (petit mal)**: Seizure with brief lapse of awareness, eye or muscle fluttering, and sometimes loss of muscle tone. There may be a period of unconsciousness so brief that neither the individual nor observers are aware of it.

**Myoclonic seizure**: Rapid, brief jerks of arms and legs.

**Atonic seizure (drop attack)**: Seizure that produces an abrupt loss of muscle tone, causing the individual to suddenly collapse or fall down.

*For more information: Epilepsy Foundation ([www.epilepsyfoundation.org](http://www.epilepsyfoundation.org))*

**FETAL ALCOHOL SYNDROME (FAS):** Growth, mental and physical problems that may occur in a baby when a mother drinks alcohol during pregnancy. It is a life-long disability and almost no one with FAS has normal brain development. Be aware that FAS may be present with other developmental disabilities and sometimes may not be labeled FAS due to the stigma attached to it.

*For more information: National Organization on Fetal Alcohol Syndrome ([www.nofas.org](http://www.nofas.org)).*

**FRAGILE X SYNDROME (MARTIN-BELL OR MARKER X SYNDROME):**A genetic condition caused by a defect in the FMR1 gene. May cause intellectual disability (not in all cases); tendency to avoid eye contact; hyperactive behavior; tremors and poor coordination; and large body size, forehead or ears, with a prominent jaw. Approximately one third of all children diagnosed with Fragile X also have some degree of autism.

*For more information: The National Fragile X Foundation ([www.fragilex.org](http://www.fragilex.org)).*

**FRIEDREICH'S ATAXIA:** A rare, genetic, progressive, neurologic movement disorder that occurs in early in childhood and causes degeneration of the posterior and lateral tracks of the spinal cord and cerebellum. Impacts the individual's coordination, muscle movement and some sensory functions. May also impact vision, so be sure to include a vision test in your student assessment.

**GUILLAIN-BARRÉ SYNDROME:** A neurological disorder in which the immune system starts to destroy the myelin sheath that surrounds the axons of many nerve cells and may sometimes destroy the axons themselves. The onset can be quite sudden (days or weeks) and the result is an inability to feel heat, pain and other sensations. Symptoms can become life threatening and while partial recovery is possible, some degree of weakness may still be present.

*For more information: GBS/CIDP Foundation International ([www.gbs-cidp.org](http://www.gbs-cidp.org)).*

**HUNTINTON'S DISEASE (HUNTINGTONS CHOREA):** A hereditary, progressive disease of the central nervous system. May cause personality and behavioral changes; cognitive decline; and various motor symptoms. These motor symptoms may include restlessness and twitching; decline in coordination; facial grimaces, a twisted neck or an arched back; localized or generalized weakness; impaired balance; rigidity; involuntary jerking, twisting or writhing motions and difficulty speaking and swallowing. People with Huntington's disease may burn as many as 5000 calories a day and physical activities such as skiing or snowboarding add to that calorie depletion, so be sure your student is getting adequate nutrition to maintain body weight. Your student may also be vulnerable to dehydration. Higher elevation and greater physical activity can exacerbate this situation, so make sure he/she drinks plenty of liquids.

*For more information: Huntington's Disease Society of America ([www.hdsa.org](http://www.hdsa.org)).*

**I**

**INTELLECTUAL DISABILITY (MENTAL RETARDATION/MR):** While the term *mental retardation* has been used historically, the term *intellectual disability* is now preferred. *Bold Tracks* defines this as “one who, from childhood, develops at a below-average rate and experiences difficulty in learning, social adjustment and economic productivity”. The disability can range from mild (largest group) to severe. There are many causes, including an illness of the mother during pregnancy (e.g., Rh-factor incompatibility); birth trauma; genetic disability; lack of mental stimulation; physical abuse; and poverty.

**Degrees of Severity of Intellectual Disability:**

<u>Degree</u>	<u>IQ Level</u>	<u>Population %</u>
Mild	50-55 to 70	85
Moderate	35-40 to 50-58	10
Severe	20-25 to 35-40	3-4
Profound	20 to 25	1-2

For more information: American Association on Intellectual and Developmental Disabilities ([www.aamr.org](http://www.aamr.org)).

**LEARNING DISORDERS:** An abnormality in cognitive *processing* (deficits in vision, perception, linguistic processes, attention or memory, or combination thereof), resulting in a substantially below standard achievement in academic skill testing (i.e. reading and math). These individuals have difficulties processing messages to the brain making it difficult for the individual to learn in one or more areas. However, normal or above normal intelligence is not uncommon. It is conservatively estimate that approximately 1.8 million children between the ages of 3 to 21 in the United States have learning disabilities severe enough to warrant special education services. The prevalence of learning disabilities is far greater among boys than girls.

**LIMB DEFICIENCY:** Complete or partial loss of a part of a limb. May be congenital or caused by in-vitro exposure to a toxin (e.g., thalidomide); severe infection (e.g., meningococcal) or amniotic banding (fibrous bands from the sac surrounding the fetus form a tight band around a developing limb, causing amputation).

**LUPUS (SYSTEMIC LUPUS ERYTHEMATOSUS ; SLE):** A chronic, inflammatory autoimmune disorder that may affect the skin, joints, kidneys and other organs. May cause sensitivity to sunlight, so remind the student to wear sunglasses or goggles and apply sunscreen often. Choose terrain that minimizes the impact on the student’s joints.

For more information: Lupus Foundation of America, Inc. ([www.lupus.org](http://www.lupus.org)).

**MULTIPLE SCLEROSIS (MS):** A progressive disease that causes the myelin sheath around nerve cells to become scarred or to disappear so that the nerves no longer transmit the necessary signals. The disease may go into remission, but generally worsens over time (varies from individual to individual). It occurs more often in women than men; initial onset is usually in the late twenties or early thirties. Fatigue and heat tends to make the symptoms worse. Muscle paralysis may be partial or full in any limb and loss of sensation may also be partial or full in any area. Visual problems are very common.

For more information: National Multiple Sclerosis Society ( [www.nationalmssociety.org](http://www.nationalmssociety.org) )



**MUSCULAR DYSTROPHY (MD):** A group of progressive, degenerative diseases causing weakness of voluntary and skeletal muscles, which control movement. Caused by a defective gene that is passed from parent to child. There are nine main types (Becker, Congenital, Distal, Duchenne, Emery-Dreifuss, Facio-Scapular-Humeral, Limb Girdle, Myotonic and Oculopharyngeal) and they vary in severity, symptoms, population affected and prognosis. Here are three of the most common types:

**Becker Type:** A form of MD similar to Duchenne MD but often much less severe. Onset usually occurs in adolescence or adulthood. Mainly affects males. Generalized weakness and wasting first affects the muscles of the hips, pelvic area, thighs and shoulders. Calves are often enlarged. There may also be significant damage to the heart muscles.

**Duchenne Type:** The most common and most severe form of MD. Onset is usually between ages 3 - 10. Males are affected more than females. Generally a delay in learning to walk, with frequent falls. A waddling gait is usually apparent by 6 years of age. Generalized weakness and muscle wasting first appears in the muscles of the hips, pelvic area, thighs and shoulders. Calves are often enlarged. Eventually affects all voluntary muscles and the heart and breathing muscles. Survival is rare beyond the early 30s.

**Myotonic (MMD or Steinert's Disease):** The most common form of MD in adults, it affects both men and women. A congenital variant appears at birth and is more severe. Myotonia (prolonged spasm or stiffening of muscles after use) affects the face, lower legs, forearms, hands and neck. May also affect the gastrointestinal system, vision, heart or respiration. Learning disabilities may occur. Life expectancy is decreased.

*For more information about these or other types of MD: MDA ([www.mdausa.org](http://www.mdausa.org))*

**MYASTHENIA GRAVIS:** A neuromuscular disorder created by an abnormal immune response. Characterized by variable weakness of voluntary muscles and often improves with rest and worsens with activity. Pace the lesson to allow scheduled rest periods. Be aware that stress and excessive heat exposure can worsen symptoms.

*For more information: Myasthenia Gravis Foundation of America, Inc. ([www.myasthenia.org](http://www.myasthenia.org))*

**NEUROMUSCULAR DISEASES:** A group of central nervous system diseases affecting the motor system, causing weakness or clumsiness with voluntary motion and involuntary movement. These diseases include: Huntington's Disease, Parkinson's Disease, Friedreich's Ataxia, Amyotrophic Lateral Sclerosis (ALS), Guillain-Barre Syndrome, and Myasthenia Gravis.

**PARALYSIS (PLEGIA) & PARESIS:** General terms used to describe severe or complete loss of muscle strength. **Paralysis** (plegia) refers to the complete loss of function in an affected limb or muscle group. **Paresis** refers to a partial loss of function in an affected limb or muscle group. Types of paralysis and paresis are classified by region. Here are the types most commonly seen by adaptive skiers and snowboarders:

**Diplegia & diparesis:** affecting the same body region on both sides of the body (e.g., both arms or both sides of the face)

**Hemiplegia & hemiparesis:** affecting one side of the body

**Monoplegia & monoparesis:** affecting only one limb

**Paraplegia & paraparesis:** affecting the lower limbs

**Quadriplegia & quadripareisis:** affecting all four limbs & the trunk (sometimes called tetraplegia & tetraparesis)

**Triplegia & tripareisis:** affecting three limbs

**PARKINSON'S DISEASE:** Progressive disorder of the brain that occurs when the nerve cells in the part of the brain that control movement are gradually destroyed. Leads to tremors and difficulty with walking, movement and coordination. May affect one or both sides of the body, with varying degrees of loss of function. Be aware that tremors may be worse when tired, excited or stressed.

*For more information: National Parkinson Foundation ([www.parkinson.org](http://www.parkinson.org))*

**POLIO (POLIOMYELITIS):** Viral disease that can affect nerves and lead to partial or full paralysis. In the U.S., the widespread use of the polio vaccine since the early 1960's has virtually eliminated the disease but there are still many people living today who contracted polio before the vaccine was available.

**POST POLIO SYNDROME:** A progressive, degenerative disease that affects polio survivors years after recovery from initial polio attack. Not contagious, even though the original polio was contagious. Can be neuromuscular and orthopedic in nature. Symptoms vary from person to person. The disease is very disabling since resulting problems are added to preexisting damage that occurred at the initial polio infection. There is no cure. Some symptoms are: excessive fatigue, muscle atrophy, muscle spasms, disc disease, and nerve damage resulting in muscle weakness, scoliosis, and other symptoms. Individuals are treated according to symptoms. Skiing or snowboarding should be reduced or discontinued if the student experiences additional weakness, excessive fatigue or unduly prolonged recovery.

**POST TRAUMATIC STRESS DISORDER (PTSD):** A type of anxiety disorder that occurs after a person has seen or experienced a traumatic event that involved the apparent threat of injury or death. The types of traumatic events that can cause PTSD are wide ranging, including natural disaster; the events of war; assault; domestic or childhood abuse; and rape. If possible, avoid triggers or warn your student if you expect a known trigger. For instance, the sound of avalanche bombing may be a trigger for a combat veteran. Do not touch your student from behind (even on the shoulder) and ask before touching when you are giving a kinesthetic demonstration. Give the student as much control as possible with options, timetables and maps. Offer positive distractions if your student appears distressed.

*For more information: United States Department of Veterans Affairs, National Center for PTSD ([www.ptsd.va.gov](http://www.ptsd.va.gov)); American Psychological Association ([www.apa.org](http://www.apa.org)); National Alliance on Mental Illness ([www.nami.org](http://www.nami.org)).*

**RETT SYNDROME:** A rare disorder of the nervous system that causes developmental reversals, especially in expressive language, hand use and in later stages, mobility. Most have trouble eating, so they are often shorter and weigh less than average. May be prone to severe and chronic constipation, seizures, cardiac dysrhythmias, bone fractures or scoliosis. To avoid aggravating breathing problems, structure the lesson to minimize stress.

*For more information: International Rett Syndrome Foundation ([www.rettsyndrome.org](http://www.rettsyndrome.org)).*

**SENSORY PROCESSING DISORDER (SPD):** Neurological disorder in which sensory signals don't get organized into appropriate responses. May cause an over-response or under-response to sensation. Often misdiagnosed as ADHD because it may cause focus issues, a hyper desire for sensation or socialization difficulties. May also cause difficulties with communication and coordination.

*For more information: [www.spdfoundation.net](http://www.spdfoundation.net)*

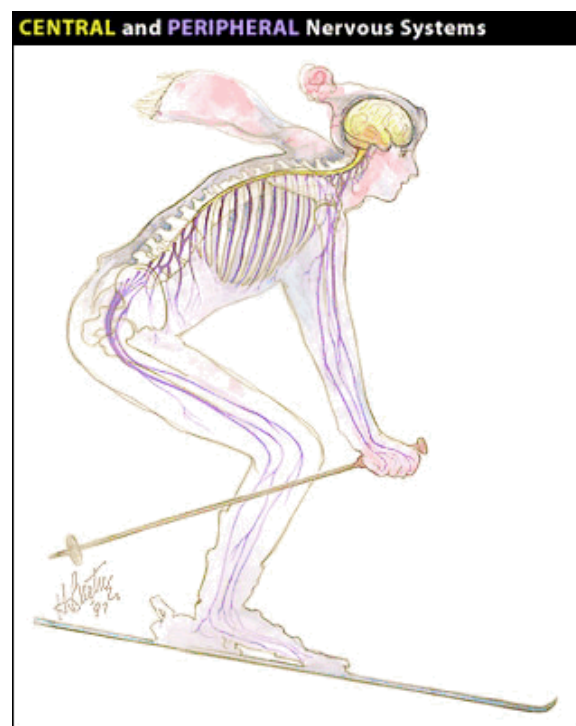
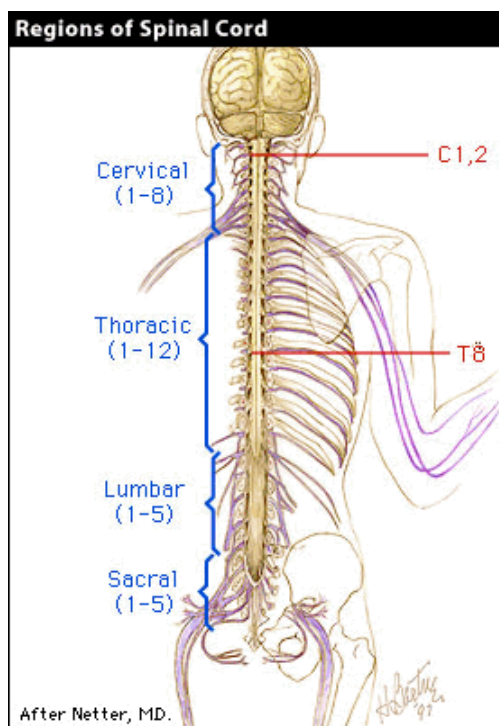
**SPINA BIFIDA:** A birth defect resulting from a congenital abnormality in which the spinal column doesn't close completely around the spinal cord (usually at L5-S1 level). May affect the extremities, up to paraplegia. Often includes bowel or bladder issues, so check to see if the student uses any supplemental devices, such as an indwelling catheter connected to a leg bag. More severe cases of spina bifida may include hydrocephalus (a build-up of excess fluid in the brain), which is usually treated with a shunt. People with spina bifida may be susceptible to allergies, especially to latex and duct tape.

*For more information: Spina Bifida Foundation ([www.spinabifidaassociation.org](http://www.spinabifidaassociation.org))*

**SPINAL CORD INJURY (SCI):** Spinal cord damage due to some type of insult, such as trauma, infection or tumor. A person may have an **incomplete spinal cord injury**, which means that there is some level of motor and/or sensory function below the level of injury. In a **complete spinal cord injury**, there is no motor or sensory function below the level of injury. Damage which occurs in the cervical region is described as quadriplegia or quadriparesis, as it involves function to all four quadrants of the body. Damage in either the thoracic, lumbar or sacral region is considered paraplegia or paraparesis. Approximately 50% of all spinal injuries cause quadriplegia or quadriparesis. Some of the most common levels of injury are C5-C6, T6-T7 and T12-L1 as this follows the curvature of the vertebral column.

Be aware of the symptoms of autonomic dysreflexia and call ski patrol immediately if your student experiences this life-threatening condition. A student with a spinal cord injury may also have a spinal fusion, which may inhibit the spine's normal flexion and extension.

Thermoregulation and pressure sores are common issues for those with spinal cord injuries and lack of sensory function may render the student unaware of these problems.



*Images from the National Institutes of Health*

**The Spinal Column is divided into five regions:**

- 1- **Cervical Region** (Neck):  
This region contains the first seven vertebrae and the first eight spinal nerves.
- 2- **Thoracic Region** (Chest):  
This region contains the next twelve vertebrae and the next twelve spinal nerves.
- 3- **Lumbar Region** (Lower Back):  
This region contains the next five vertebrae and the next five spinal nerves.
- 4- **Sacral Region** (Tail Bone):  
This region contains the next five vertebrae fused into one and the last six spinal nerves.
- 5- **Coccyx**:  
This region contains four vertebrae fused into one and no spinal nerves

**SPINAL MUSCULAR ATROPHY (SMA):** A group of inherited and often fatal diseases which destroy the nerves controlling voluntary muscle movement. May affect crawling, walking, head and neck control and swallowing. Pace lesson to avoid breathing difficulties, which can rapidly escalate to an emergency.

*For more information: Spinal Muscular Atrophy Foundation ([www.smafoundation.org](http://www.smafoundation.org)).*

**TRAUMATIC BRAIN INJURY (TBI):** Acquired brain damage caused by some type of insult to the brain. There are three categories:

**Closed head injury (Diffused injury):** This is caused by trauma to the head which does not cause a fracture to the skull. Injury can be in one or in multiple areas of the brain.

**Focal injury:** Part of the skull is forced into the brain.

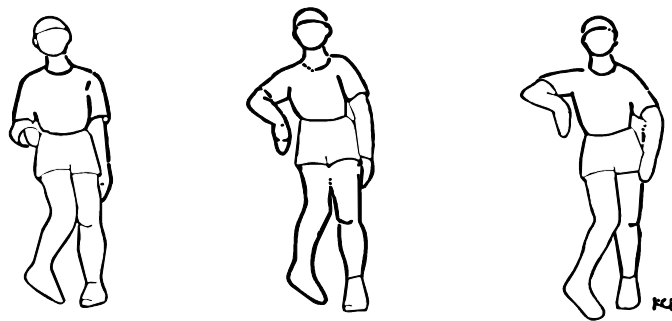
**Hypoxia:** Injury caused by the lack of oxygen

# COMMON GAITS IN ADAPTIVE STUDENTS

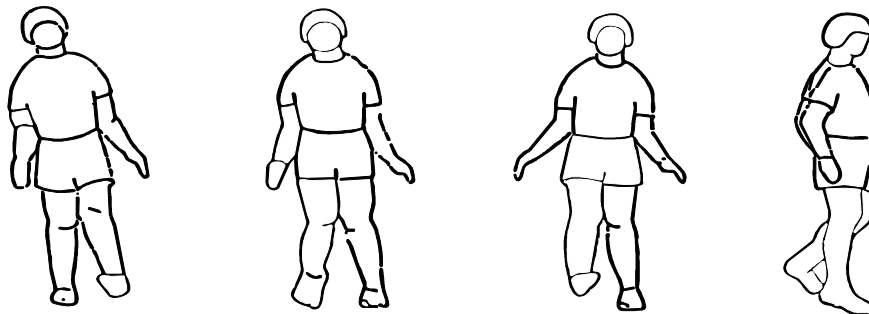
**Gait** - Manner of walking

Careful observation of the student as they walk into the ski lodge can reveal what muscles are affected and the degree of impairment. Sometimes impairment of gait may be caused by mechanical factors, such as disease of bones, tendons, joints or muscles. Damage or lesions at different levels of the nervous system are very important causes of gait abnormalities. A few of the most common gaits are listed and illustrated below:

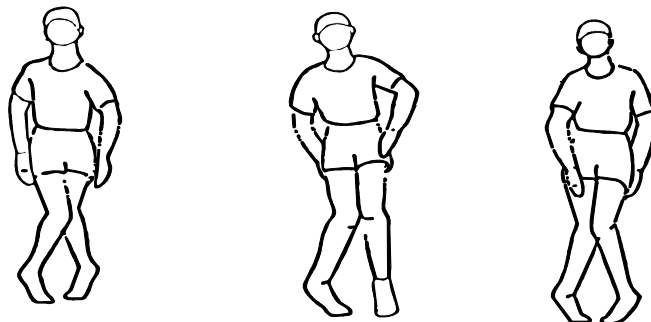
**Cerebellar gait.** Characteristics of ataxic cerebral palsy, Friedreich's Ataxia, and similar to Les aytres. Irregularity of steps, unsteadiness, and tendency to reel to one side. Problems are increased when the ground is uneven.



**Hemiplegic gait.** Characteristics of hemiplegic spastic cerebral palsy. Both arm and leg on the same side are involved. Individuals lean to the affected side, and arm on that side is held in a rigid, semi flexed position.

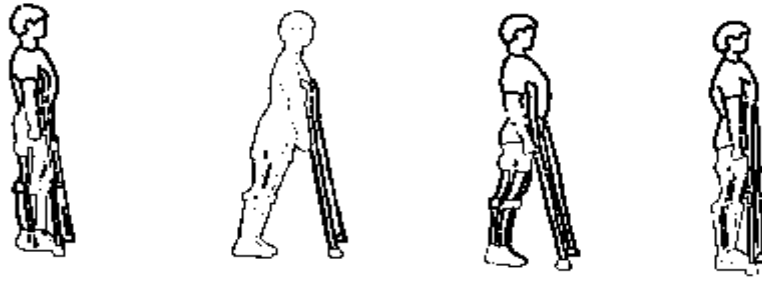


**Scissors gait.** Characteristic of quadriplegic spastic cerebral palsy. The legs are flexed and abducted at the hip joint causing them to cross alternately in front of each other with the knees scraping together.

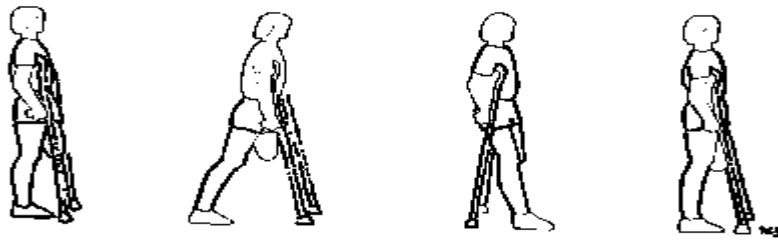




**Step to, swing to, or drag to gait.** All the weight is taken by the arms while the legs are lifted and swung or dragged forward. The pattern is lift and drop, lift and drop. A good example would be a person with spina bifida in long leg braces.



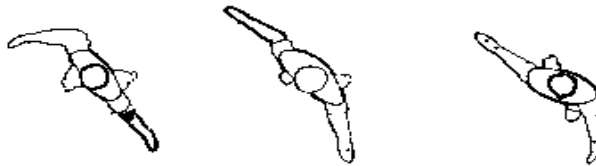
**Swing through gait.** The body is swung through the crutches so that the good foot lands in front of the crutches. Then the crutches are brought forward and the sequence is repeated. This gait is used by most leg amputees.



**Waddling gait.** This gait is very similar to the muscular dystrophy gait. Characterized by awkward side to side waddle, sway back, arms held in backward position and frequent falling.



**Illustrations by Kathryn Bevier**



# MEDICATIONS

Participants with disabilities may take medications for a variety of reasons. Any medication has the potential to cause a side effect. Some of these side effects may impact skier/rider performance. As an adaptive instructor, a basic understanding of medications, their use and the side effects is important.

Following is a list of common drug classifications, along with their shared side effects. This is not a complete list of medications and individual medicines may have many more side effects than those listed.

Several resources for information on medications are available, such as the *Physician's Desk Reference* (PDR), Nursing drug guides and the Internet, including these sources:

Drugs.com: [www.drugs.com](http://www.drugs.com)

Healthline: [www.healthline.com](http://www.healthline.com)

Medicinenet.com: [www.medicinenet.com](http://www.medicinenet.com)

MedlinePlus: <http://medlineplus.gov>

U.S. Food and Drug Administration Medication Guides:  
[www.fda.gov/Drugs/DrugSafety/ucm085729.htm](http://www.fda.gov/Drugs/DrugSafety/ucm085729.htm)

*A word about medication side effects: When you look up a drug, all possible side effects are listed. Researchers are required to list ALL side effects that occur, whether one person or one hundred people experience the side effect. Your student may have none of the side effects or several. Check with the student or his/her parent or caregiver about the response to medications.*

As you read through the medication section, recognize that ANY medication has the potential to cause nausea, vomiting or diarrhea. Therefore, these three side effects are not listed.

## **ANALGESICS: Relieve pain**

*non-narcotic:* sedation • rash • convulsions.

*narcotic:* sedation • lethargy • dizziness • confusion • increased • sweating • respiratory & circulatory depression • constipation • drug dependency with potential for abuse

## **ANTIBACTERIALS: Treat urinary tract infections**

dizziness • headache • rash • sun sensitivity

## **ANTIBIOTICS: Treat infections**

allergic reactions (ranging from skin rashes to anaphylaxis) • dizziness • drowsiness • sun sensitivity

**ANTICHOLINERGICS: Treat bladder spasms**

dry mouth • constipation • tiredness • headaches

**ANTICOAGULANTS: Treat or prevent blood clots**

dizziness • drowsiness • sun sensitivity • easy bruising • excessive bleeding

**ANTICONVULSANTS: Treat seizure disorders**

dizziness • drowsiness • fatigue • tremors • rash • weight gain

*Note: many anticonvulsants are used in conjunction with each other. Also, some anticonvulsants are used for non-seizure problems, so be sure to check why your student is taking the medication.*

**ANTIDEPRESSANTS: Control depression & in some cases, chronic pain**

dizziness • fatigue & drowsiness • blurred vision • increased appetite & weight gain • decreased sexual desire • insomnia • dry mouth • constipation • agitation, restlessness & anxiety

*Note: some antidepressants may actually increase depression, even causing suicidal thoughts*

**ANTIDIABETICS: Control diabetes**

hypoglycemia • vomiting • diarrhea

**ANTIEMETICS: Control nausea and vomiting**

drowsiness • dizziness • abnormal movements • lethargy • dry mouth • blurred vision

**ANTI-HYPERTENSIVES: Control high blood pressure**

dizziness or lightheadedness • headache • fatigue • depression • insomnia

**ANTIMALARIALS: Treat malaria; decrease symptoms of lupus & rheumatoid arthritis**

irritability • headache • weakness • hair lightening or loss • stomach upset • nausea • dizziness • muscle pain • rash • itching

**ANTI-PARKINSON'S: Relieve symptoms of Parkinson's disease; treat emotional incontinence; relieve pain of shingles**

occasional involuntary movements • muscle twitching • dizziness • muscle jerks during sleep • hand tremor also may occur. • memory loss • anxiety • nervousness • agitation • restlessness • confusion • inability to sleep • nightmares • daytime tiredness • mental depression • euphoria • vomiting • loss of appetite • weight loss

**ANTIPSYCHOTICS: Manage symptoms of psychotic disorders**

dizziness • drowsiness

**ANTISPASMODICS: Reduce muscle spasms**

drowsiness • dizziness • fatigue • dry mouth • blurred vision

**CHEMOTHERAPY DRUGS: Destroy bacteria, viruses, fungi and most commonly, cancer cells**

anemia • hair loss • fatigue • nerve pain • infection

**DIURETICS: Promotes the formation of urine by the kidneys**

low blood pressure • electrolyte imbalance • dehydration • abdominal pain

**GOLD TREATMENTS: Treat rheumatoid arthritis**

rash • mouth sores • blood or protein in urine • kidney damage • abnormal blood counts • hair loss • gingivitis

**H2 BLOCKERS: Treat or prevent ulcers**

headache • dizziness • constipation • diarrhea • rash • muscle aches

**IMMUNOSUPPRESSIVES: Decrease over-activity of immune systems; used in transplant patients to prevent rejection**

mouth sores • vomiting • reduced ability to fight infection

**IMMUNOSUPPRESSIVES: Treat multiple sclerosis (MS)**

flu-like symptoms that include high fever, chills and achy feeling • depression (which may be severe enough to lead to suicide) • increased risk of infection

**MUSCLE RELAXANTS: Relax stiff or rigid muscles**

drowsiness • dizziness • fatigue

**NONSTEROIDAL ANTI-INFLAMMATORY DRUGS (NSAID's): Prevent or reduce inflammation**

vomiting • diarrhea • constipation • decreased appetite • rash • dizziness • headache • drowsiness

**PSYCHOSTIMULANTS: Control behavior, especially for ADD/ADHD**

over-stimulation • restlessness • dizziness • dry mouth • problems sleeping

**SEDATIVES: Reduce anxiety**

drowsiness • sedation • fatigue • dizziness

**STEROIDS (CORTICOSTEROIDS): Decrease inflammation & swelling; decrease severity & shorten the length of attacks in many diseases; slow the progress of many diseases**

confusion, excitement and restlessness • headache • skin problems, including acne and thin, shiny skin • fluid retention and weight gain • increase in blood sugar • mental depression & mood swings • increased risk of infection

**STOOL SOFTENERS: Regulate bowel function**

diarrhea • stomach or intestinal cramps • throat irritation (from oral liquid form)

# ADAPTIVE EQUIPMENT

The equipment listed below is most of the adaptive equipment which is currently available. All equipment should be checked before and after use to ensure it is in working order.

**ANKLE/FOOT ORTHOTIC (AFO):** Braces, usually made of plastic, which may be used by individuals who have a neuromuscular disorder or who have had a spinal cord injury or CVA. AFO's are used to control the motion of the ankle joint and offer support to the foot. They are generally NOT used in a ski boot because the ski boot itself offers excellent support. If your student needs to wear an AFO while skiing or snowboarding, you may need to size the boots up.

**BI-SKI:** A seat is mounted onto two asymmetrically cut skis. Shock absorbing material or a gas/oil shock may be part of the system. Fixed outriggers and/or handlebars may be attached to assist the skier. The bi-ski is usually tethered with a dual tether line. Some advanced skiers may use individual handheld outriggers (not fixed), self load, and ski untethered.

**BAMBOO POLE:** Bamboo poles or lengths of PVC pipe that can be used by the instructor and adaptive skier together for a variety of purposes, such as guiding a student with a visual impairment; providing a sense of security for a student who is nervous; developing turn shape; and assisting with speed control.

**BLIND SKIER/GUIDE BIBS:** Bibs to be worn by blind/visually impaired skiers/riders and their guides. These bibs alert the public to the special needs of the skier/rider and are sometimes used for guide identification by the participant with low vision.

**BLOCKS & BUNGIES:** A permanent type of ski-bra system where holes are drilled through the tip of the ski, and they are held together by means of a chain or heavy bungee cord. Blocks can be installed on skis to prevent crossing. Bungies are used if the skier has decreased lateral control that would cause undesired external rotation of one or both legs.

**CADS:** The CADS (Constant-force Articulated Dynamic Struts) system provides additional support to skier's legs for those with general leg weakness and joint pain. A webbing strap goes around each thigh, with a cord from each strap passing over a little pulley at the top of a slender fiberglass rod and down to a thick rubber band anchored in a swivel at the back of each boot, which also sockets the lower end of the rod.

**CANTS & LIFTS & FOOTBEDS:** Thin pieces of material that are placed inside the ski boot to provide optimum fit or to help the stand-up skier achieve a natural stance and have the ski run flat on the snow. The general rule of thumb is to have the cants "fill the gap" when the student is structurally unable to make a flat ski on the snow.

**CLAM SHELL:** A bamboo pole assist in which two heavy poles are held by two instructors: one pole is placed under the buttocks of the student and the other is placed waist or chest height for the student's hands.

**DUAL-SKI / TWIN SKI:** A sit-ski in which a seat is mounted onto two modern side-cut skis. Shock absorbing material or a gas/oil shock may be part of the system. Fixed outriggers and/or handle bars can be attached to assist the skier. May be tethered with a single or dual tether line. Some advanced skiers may use individual handheld outriggers, self load and ski untethered.



**EDGIE WEDGIE**<sup>®1</sup> A lightweight (6") piece of rubber tubing with a small clamp and a thumb screw at each end. It does not prevent the ski tips from crossing, but loosely holds the tips together. A similar product is named **Easy Wedge**.

**FOOT ORTHOTIC (FO)**: Shoe inserts that are designed to control and support foot function by modifying areas of weight-bearing on the foot. FO's can fit inside the ski or snowboard boot.

**HARNESS**: A strapping device that goes around the hips or waist of the student. The instructor can influence speed control and turning if the tethers are attached to each side of the harness. A daisy chain from the harness, wrapped around the chairlift back and carabineered back onto itself can aid in seat retention.

**HORSE & BUGGY**: A bamboo pole assist using two poles, one in each hand of the student and instructor. The poles are held at hip height with one person skiing in front and the other immediately in back.

**HULA HOOP**<sup>®2</sup>: Plastic tubing in a circular form that can be used to assist the stand-up skier. The instructor and student hold on to the hula hoop while the instructor skis backwards. Because of the semi-flexible nature of the hula hoop, this method prevents the student from leaning too heavily on the adaptive equipment.

**MONO-SKI**: The molded seat and foot support are mounted on a shock absorber attached to a single ski. Outriggers are used by the student to maintain balance. Skiers can self load by raising the bucket to chairlift height.

**OUTRIGGERS**: "Canadian" style fore-arm crutches with a ski tip mounted at the base. Regular or lightweight ski tips may be used for the skis. A string/spring mechanism allows the ski to flip up for a more stable crutch position for walking, or to lay flat for sliding. They come in many different sizes and are adjustable. Claws, studs and or metal baskets may be attached to the heel of the outrigger ski.

**PECS/ SCHEDULES**: The Picture Exchange Communication System (PECS). A unique augmentative/ alternative training package that teaches children and adults with autism and other communication deficits to initiate communication through pictures. Schedules and picture schedules can assist in the skiing process.

**PERSONAL TWO-WAY RADIOS**: Voice-activated radio systems that fit inside helmets that can be used for verbal guiding, usually with students who have a visual impairment.

**SAFETY HELMETS**: A fiberglass headpiece used to protect student while skiing or riding.

**SKI-BRA**: A clamp type device with a hook and eye assembly, which screws to the tips of the skis. The device will not damage the skis. It prevents the tips from crossing or separating but it allows the skis to be parallel and in a wedge position. This item is generally used if the skier has decreased lateral control that would cause undesirable internal rotation of one or both legs. Care should be taken to prevent the skier from sliding backwards.

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<sup>1</sup> EDGIE WEDGIE<sup>®</sup> is a registered trademark and copyright of Vernon Miller.

<sup>2</sup> Hula Hoop<sup>®</sup> is a registered trademark of Wham-O, Inc.

**SKI LEGS/SLIDER:** Originating from the concept of a walker with skis, this device is a tubular frame for trunk and forearm support. Height and width are adjustable and all joints articulate. The unit has adjustable edge angle and ski orientation (wedge or parallel) between the ski and the snow. It also adjusts for height and width of the student.

**SKI-PAL**<sup>3</sup>: An adjustable, oblong-shaped, heavy-duty tube that can be used to assist a stand-up skier or snowboarder control speed and initiate turns.

**SLANT BOARD:** An adaptive device which consists of a binding mounted on top of a board, which is then mounted to a ski by use of a ball and pinion joint. Can be used for students with extreme leg-length discrepancies; extreme supination or pronation; or the inability to apply pressure to the front or back of the ski.

**SLIDER/TROMBONE:** This version of a ski-bra enables the student to move the skis forward and backwards, which allows a small amount of shuffling. It is much heavier than a regular ski-bra.

**SNO-WING**<sup>4</sup>: An elliptical (football-shaped) frame with a harness inside that attaches to the frame at four points. The harness is set at or slightly above the hips of the stand-up skier or snowboarder. The Snow-Wing is positioned so that “points” of the football shape are on either side of the student. The instructor can move around the frame to be face to face with the student or to guide from behind. Extender bars can be added at the “points” of the frame and the instructor and assistant instructor can be on either side of the student.

**SPACER BAR:** A heel stabilizer made from a hollow piece of tubing (often PVC pipe) with a bungee cord running through it. The spacer bar attaches under the ski boots at the heels and helps the skier keep his/her skis from crossing or getting too far apart. When using a spacer bar, you should ALWAYS use a tip stabilizer, such as a ski bra or slider.

**TETHERS/REINS:** Long straps which can be attached to the ski-bra or sit-ski to control the turn shape and speed of the student.

**WALKERS:** Adjustable hospital walkers with skis attached are utilized for students with severe balance problems and who can not totally support themselves. Recommended height selection is approximately hip high or in a position to offer the skier the support that is most beneficial to their physical needs. Usually two instructors are required to assist students.

**WEE SKI:** A harness system used for children. The system is secured around the child’s chest and two tethers extend behind the child so that the instructor can easily tether the student, providing speed control, braking and assistance with turn initiation. A similar product is called a **Ski Trainer**.

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<sup>3</sup> *Ski-Pal* is a registered trademark of Ski-Pal, LLC.

<sup>4</sup> *Sno-Wing* is a trademark of Johnny Boy Enterprises, Inc.

# BEHAVIOR MANAGEMENT

Behavior management is used frequently in special education, particularly with some adaptive students. It is essential that the adaptive ski instructor be familiar with some of the common procedures. The first step is to discuss with the parent/guardian which techniques they use with the student. When possible, the instructor should utilize the same technique.

## **DEFINITIONS:**

### **Behavior:**

The manner in which one acts; the actions or reactions of individuals under specific circumstances.

### **Behaviorism:**

A theory of conduct that regards normal and abnormal behavior as the result of learned responses (conditioned reflexes) apart from the concept of will. For example, if one's responses are as a result of having learned to respond in a particular way, then that person can learn to respond in other, more effective/or acceptable way.

### **Behavior Management:**

The use of behavioral teaching techniques in order to decrease instances of inappropriate behavior and to replace them with appropriate behavior.

### **Behavior management is based on the concept of cues & consequences.**

- 1) Cue is the term for a signal, condition, command or instruction that elicits the desired response.  
The following are three recommended rules to follow when giving cues:
  - Make the cue as clear/brief as possible.
  - Use the same cue each time. (i.e. come, go, stay, or "ready, ski").
  - Do not repeat the cue until the student makes some kind of response. If correct response is made reinforce. If no response or incorrect action is demonstrated use a correction procedure (i.e. No, do it this way - demonstrate again).
- 2) Consequence is immediate feedback or information relative to a behavior that increases or decreases that behavior or response.
  - Aggressive behavior (i.e. hitting, scratching kicking, etc.) may require negative feedback followed immediately by positive feedback relative to desired outcomes. It may also require removing the student from the environment and activity. The instructor should try to determine the cause of the behavior.
  - Noncompliant behavior (i.e. I can't, I won't, I'm scared etc.) ignoring, diverting their attention, or engaging in an activity that is comfortable for them.
- 3) The following are recommendations to be followed when enacting consequences:
  - Give immediate feedback for the students actions.
  - Accompany nonverbal (food, tokens, hugs, etc.) with words.
  - Ignore noncompliant behavior.
  - Address/punish aggressive behavior by emphasizing positive behavior and desired result (non-physical).

### **Behavior Management Steps:**

- 1) Determine/specify desired behavior.
- 2) Establish baseline.
- 3) Apply intervention (intervention can be as simple as praising desired behavior and ignoring other types or as complex as punishment).
- 4) Evaluate if intervention is effective (i.e. desired behavior increases).

### **Behavior Modification and Teaching Strategies:**

Behavior modification teaching strategies are numerous and vary in their applied techniques. Some commonly used in teaching, they are: Operant Conditioning, Reinforcement, Punishment, Contracts and Token Economy.

- **Operant Conditioning:** Behavioral changes in a person's response to events or stimuli that occur. In different words, producing desired responses identified by the results rather than the stimuli. Key element in this theory is reinforcement.
- **Reinforcement:** Anything that reinforces the desired behavior or response is called reinforcement.
- Reinforcements come in the form of physical, verbal, visual, edible, rewards, positive, negative, immediate, delayed, group, and individual.
  - Physical: A pat on the back, hi-five etc.
  - Verbal: "That was a great demo-excellent!"
  - Visual: Giving the "thumbs-up" sign.
  - Edible: A piece of candy.
  - Rewards: "You have done so well, now let's take a free run".
  - Positive: All the above and more that reinforces the positive desired response.
  - Negative: The removal of non-desired action. Outlining unmet goals ("you did not do xxx) or unacceptable behavior.
  - Immediate: Spotlighting movements, actions while they happen, most likely verbally.
  - Delayed: Noting movement or desired behavior after it happens.
  - Group: Including the entire group for combined efforts or team work.
  - Individual: Working with individual to reinforce desired reaction.
- **Punishment:** A consequence that is not pleasing given in response to undesirable behavior. Anything (non-physical) that decreases the frequency of an undesired behavior. Punishment can include but not limited to the removal of a desired event or removal from desired or present environment (time out) Potential problems with punishment:
  - Punishment demands the instructor's constant attention.
  - There are ethical (and legal) constraints on its use.
  - The instructor may be viewed as a negative reinforcer.
  - The student may experience behavioral paralysis or may react emotionally or aggressively.
  - The student may attempt to avoid the instructor or program.
  - Punishment may lead to learned helplessness.

**Contracts:** An understanding/agreement between student and teacher clearly stating what is to be learned (behavior required) and consequences of both learning (behavior required) or not learning.

**Reward:** A token/point system where the student is rewarded tokens/points for appropriate behavior. The tokens/points should be meaningful to the student and should be traded in at the end of the day for a reward or privilege (i.e. hot chocolate, play instructor for the last run etc.).

**Token Economy:** Secondary reinforcers that are earned, collected and then redeemed for other reinforcers such as trinkets, pins, food etc.

**Timeout:** Removal from activity to a predetermined quiet place if activity becomes so stimulating that a student cannot control negative behavior.

**Concluding comments about behavior management:**

- 1) Reinforce desired behavior.
- 2) Praise student when student attempts or does a task correctly.
- 3) Aggressive behavior needs firm action followed by information and positive reinforcement of desired behavior/outcomes.
- 4) Discuss techniques with parent/guardian that can be used with student.
- 5) If you figure out a system that works well, tell the parent/guardian so they can tell the instructor next time.