

NZSIA ADAPTIVE SNOWSPORTS INSTRUCTORS MANUAL

SECTION FOUR: DISABILITIES



DISABILITIES

Each person is unique and each disability affects that person differently.

Always ask questions to learn as much as you can about the individual. The person with the disability will understand how it effects them better than anyone else.

The information in this section is a very simple overview of some common disabilities. It is to provide a starting point for more research.

The more important issue is the how will the disability affect the client learning to ski / ride and what are the safety issues of them being in an alpine environment. Red Flags are a good quick indicator of safety issues.

Disabilities are functional impairment, categorised as physical, sensory or cognitive.

People with a disability can have a combination of physical, sensory or cognitive disabilities. For example diabetes can cause amputation and visual impairment. A head injury cognitive and balance issues. More severe disabilities can present with significant cognitive and physical impaired functioning.

COMMON PHYSICAL DISABILITIES

AMPUTATION: Partial or complete removal of a limb. The causes are varied including but not limited to: accident, congenital disorder, peripheral vascular disease, cancer, diabetes and gangrene.

AK -Above knee

BK - Below knee

AE - Above elbow

BE - Below elbow

Hip Disarticulation - Amputation at the hip joint, this preserves the pelvis and the soft tissue to the buttocks .

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.

Bilateral Amputations - on both sides. This can include: 1) amputation of both legs, 2) amputation of both arms, 3) amputation of an arm on one side and leg on the other (arm and leg amputees usually ski on one ski with one outrigger).

For many lower limb amputations people will ski without their prosthesis. This is changing as new prosthesis technology allows more freedom. To ski with a prosthesis. Unilateral amputees ski though balance can be difficult.

Most snowboarders – above and below knee will use a sport prosthesis with shock technology to board with.

Of importance is how new is the amputation and how good is circulation. How will the limb handle the cold.

ARTHRITIS: Inflammation of the joints. Can be caused by many factors, the most common being osteoarthritis (wear and tear of cartilage) and rheumatoid arthritis (result of an overactive immune system).

It is classified as a rheumatic disease, which are all similar in that they affect joints, muscles, ligaments, cartilage and tendons...all very important when skiing.

CANCER: Invasion of healthy tissue by rapidly reproducing mutated cells. It often presents itself as a collection of cells known as a tumour. It can affect nearly any part/system of the body.

Treatment often includes chemotherapy, radiation, and/or surgical removal. Sometimes the removal of affected cells results in an amputation. Bouts of remission are often possible.

CEREBRAL PALSY (CP): A neurological disorder that appears just before, during or up to 3 years after birth. It is caused by abnormalities in the part of the brain that controls muscle movements.

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 a cognitive impairment or other impairments. Usually either hypertonic (tense) or hypotonic (flaccid), it's severity is wide-ranged.

There are 4 types of CP:

Ataxic – Unsteady balance, poor spatial awareness, shaky hands, jerky speech

Athetoid – jerky and/or writhing, dysarthria, inconsistent posture

Dystonic – changing muscle tension and tone, can become floppy or tense in certain positions

Spastic – stiff muscles and decreased range of motion

DIABETES: A condition that occurs when the pancreas does not make enough insulin or when the insulin it produces is not effective. Heredity is a major cause of diabetes.

Type 1 (also known as juvenile or juvenile-onset) is an autoimmune reaction and happens when the cells that make the insulin are destroyed, causing a severe lack of insulin. Triggers for this reaction are believed to be infection, exposure to chemical toxins in food or sometimes by exposure when young to cow's milk.

Type 2 is characterized more by the body's resistance to the insulin produced, insufficient insulin or insulin that doesn't work properly. Risk factors for Type 2 are age, obesity, physical inactivity, some medicines, pregnancy (gestational diabetes) or any illness that damages the pancreas.

HEMIPLEGIA: A paralysing disorder that affects only one side (hemisphere) of a person. It is caused by damage to the brain as a result of a stroke, traumatic brain injury, cerebral palsy or other disruptions of blood flow to the brain.

Left brain damage affects the right side of body. It is often characterized by poor short-term memory, distractability, lability (difficulty controlling appropriate emotions), difficulty with time and place, possible perseveration (repeating)

Right brain damage affects the left side of body. It is often characterized by dysarthria (inability of muscles that control speech), aphasia (receptive or expressive - difficulty understanding or utilizing speech to convey appropriate meaning)

MENINGITIS: Inflammation of the meninges (covering of the brain and spinal cord). Generally caused by a bacterial or viral infection. Lesser seen causes include physical injury, cancer or certain drugs. Can cause disabilities ranging from hearing loss, CP and paralysis.

MULTIPLE SCLEROSIS: An autoimmune disease that affects the central nervous system and gets progressively worse. Although the cause is not known for certain, it is a result of damage to the myelin sheath - the nerve casing. In addition to nerve damage, inflammation leaves multiple areas of scar tissue (sclerosis) on the coverings of the nerve cells. Symptoms can vary from person to person and episode to episode. It is possible for the disease to go into remission or for symptoms to ease for periods of time.

MUSCULAR DYSTROPHY: A group of disorders involving progressive muscle weakness, deterioration and transformation to fat. The four most common types are

Myotonic: Genetic. Most common form. Begins in adulthood. Most predominant in the lower legs, hands, neck and face. Characterized by prolonged muscle tensing (myotonia) and an inability to relax certain muscles after use. Can also cause cataracts and heart problems.

Duchenne's: Rapidly-worsening. Not known to be genetic. Most severe in the legs and pelvic region. Generally presents by the age of 6. Frequent breathing disorders and near certain damage to the heart.

Becker's: Similar in presentation to Duchenne's but progresses at a much slower rate and is certainly an inherited disorder. Also, heart problems are not as common. Most people are able to walk until around 25-30 years. Women rarely develop symptoms.

Limb-Girdle: Can present anytime from child to adulthood. Affects the muscles surrounding the shoulders and hips. Slow progression. Heart problems can occur in later stages.

POLIO/POST-POLIO: Poliomyelitis - A contagious virus that attacks the anterior horns of the spinal column, affecting the nerves. It can cause paralysis, breathing difficulties and sometimes death. Once a person is infected, the virus is passed along through faecal matter making it extremely dangerous in under-developed countries with poor sanitation.

Post-polio is a condition that can affect polio survivors years after the virus' initial onset - not only weakening previously affected muscles but also those that were presumed unaffected. Progressive muscle weakness and atrophy, joint degeneration and scoliosis are all characteristics.

SPINA BIFIDA: A defect that occurs to an embryo during early pregnancy. The two sides of the embryo's spine do not join together leaving an open area. The spinal cord can then push through the opening into the embryo's back creating a lesion.

There are two types:

- Occulta:** Means 'hidden' and is the mildest form. The spinal cord is often unaffected.
- Manifesta:** Two types - meningocele and myelomeningocele. Myelomeningocele is the most severe form where the spinal cord pushes through. Babies born with this type often also have hydrocephalus - requiring a shunt.

SPINAL CORD INJURY (SCI): An injury to an area of the spinal cord. Most cause permanent disability and loss of movement. Paraplegia (lower half of body), quadriplegia and tetraplegia (majority of body including arms and legs) are all types of specific SCIs. Incomplete spinal cord injuries can often walk and snowboard / ski.

THE SPINE

The spine is a very complex mechanical structure that is highly flexible yet very strong and stable, regardless of your position or activity, including sleeping, there is always some type of physical demand being placed on it.

The primary functions of the spine include:

- Protect the spinal cord, nerve roots, and internal organs
- Provide flexibility of motion
- Provide structural support and balance for upright posture. The spine bears the load of the head, shoulders and arms, and upper body. The upper body weight is then distributed to the hips and legs. The spine attempts to keep the body's weight balanced evenly over the pelvis. This reduces the amount of work required by the spinal muscles and can eliminate muscle fatigue and back pain.

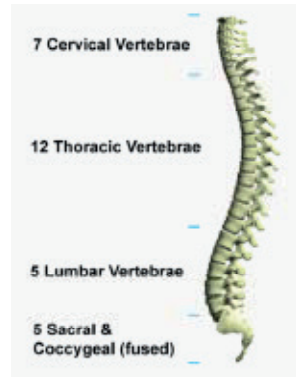
The spinal column is comprised of 26 individual bones called vertebrae. The spinal column is divided into 5 different areas containing groups of vertebrae.

The cervical vertebrae are C1 - C7

The thoracic vertebrae are T1 –T12

The lumbar are L1 – L5

The sacrum and coccyx fused.



SPINAL CORD NERVES

Cervical Nerves "C" : (nerves in the neck) supply movement and feeling to the arms, neck and upper trunk. .

C3,4 and 5 supply the diaphragm (the large muscle between the chest and the belly that we use to breath).

C5 also supplies the shoulder muscles and the muscle that we use to bend our elbow .

C6 is for bending the wrist back.

C7 is for straightening the elbow.

C8 bends the fingers.

Thoracic Nerves "T" : (nerves in the upper back) supply the trunk and abdomen.

T1 spreads the fingers.

T1 –T12 supplies the chest wall & abdominal muscles.

Lumbar Nerves "L" and Sacral Nerves "S" : (nerves in the lower back) supply the legs, the bladder, bowel and sexual organs.

L2 bends the hip.

L3 straightens the knee.

L4 pulls the foot up.

L5 wiggles the toes.

S1 pulls the foot down.

S3,4 and 5 supply the bladder. bowel and sex organs and the anal and other pelvic muscles.

VISUAL IMPAIRMENTS

The human eye is like a camera that collects, focuses, and transmits light through a lens to create an image of its surroundings. In the eye, the image is created on the retina, a thin layer of light-sensitive tissue at the back of the eye.

The human eye controls the amount of light that enters the eye. The iris (the colored circular part of the eye) controls the amount of light passing through the pupil. It closes up the pupil in bright light and opens it wider in dim light. The cornea is the transparent, protective surface of the eye. It helps focus light, as does the lens, which sits just behind the iris.

When light enters the eye, the retina changes the light into nerve signals. The retina then sends these signals along the optic nerve to the brain. Without a retina or optic nerve, the eye can't communicate with the brain, making vision impossible.

WHAT IS VISUAL IMPAIRMENT?

Many people have some type of visual problem at some point in their lives. Many of these types of conditions are often easily treated with eyeglasses or contact lenses.

But when one or more parts of the eye or brain that are needed to process images become diseased or damaged, severe or total loss of vision can occur.

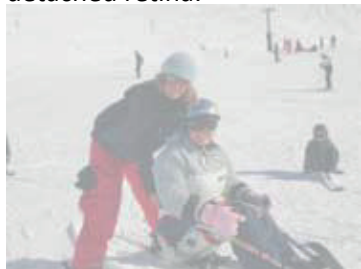
Congenital Blindness are conditions that cause vision loss from birth.

COMMON VISUAL IMPAIRMENTS

Albinsim: An heredity gene mutation resulting in the body's inability to produce melanin (pigment) or sustain adequate production over time. Lack of melanin causes abnormal eye development. Without enough melanin, a particular area of the retina necessary for sharp vision doesn't develop properly.

Amblyopia: Commonly known as 'lazy eye'. Vision is reduced because the brain does not properly acknowledge the images seen by the eye. In most cases, only one eye is affected.

Cataracts: A clouding of the lens of the eye – like looking through a foggy window. They make it more difficult to see things in general but also can affect distance vision and glare problems. Generally painless. Develop slowly, progress with age. Can be hereditary, congenital or caused by chemical burns. Surgery, while common and reasonably safe, can cause a detached retina.



foggy image caused by cataracts

Colour Blindness: Generally only affects men. Is a result of an absence or malfunction of colour-sensitive cells (cones) in the retina. The eye has three types of cone cells – each sensitive to either red, green or blue light.

Detached Retina: A condition caused when the vitreous humour does not properly detach from the retina as we age. If it remains attached, it can tear the retina when it finally pulls away. Not necessarily harmful, these tears may allow fluid to collect underneath the retina. If the fluid spreads, the retina may peel away and detach from the back of the eye – causing a detached retina. Symptoms can be gradual or sudden and often appear in one eye at a time. Distinguished by a shower of thousands of black dots across your field of vision or seeing floaters of quick white flashes. Once the detachment is complete, the entire visual field may seem darkened.

People with diabetes are at risk for a different type of this condition. It presents itself through the creation of scar tissue on a weakened blood vessel lining.

Diabetes: A condition that occurs when the pancreas does not make enough insulin or when the insulin it produces is not effective. Heredity is a major cause of diabetes.

Type 1 (also known as juvenile or juvenile-onset) is an autoimmune reaction and happens when the cells that make the insulin are destroyed, causing a severe lack of insulin. Triggers for this reaction are believed to be infection, exposure to chemical toxins in food or sometimes by exposure when young to cow's milk.

Type 2 is characterized more by the body's resistance to the insulin produced, insufficient insulin or insulin that doesn't work properly. Risk factors for Type 2 are age, obesity, physical inactivity, some medicines, pregnancy (gestational diabetes) or any illness that damages the pancreas.

Diabetic Retinopathy: An eye disease caused by changes in the blood vessels of the retina. It generally occurs in both eyes. For some people, the blood vessels may swell and leak. Others may have abnormal new blood vessels grow on the surface of the retina, which cause inflammation and scarring. The scarred tissue eventually pulls the retina away from the back of the eye. There are 4 stages to the disease but vision problems may not present themselves until long after onset. Proliferative retinopathy, the most advanced stage of the disease, occurs when fragile, abnormal blood vessels develop and leak blood into the centre of the eye, blurring vision and often causing blindness. See also: [detached retina](#).

Glaucoma: This is a condition in which the optic nerve is damaged at the point where it leaves the eye. This nerve carries information from the retina to the brain. It affects the peripheral vision first and may spread so far inward and outward that it resembles tunnel vision, eventually causing complete blindness.



Macular Degeneration: A progressive disease marked by the deterioration of the macula (centre of the retina - responsible for central vision). It doesn't cause blindness but leaves a blur, or blind spot, in the centre of vision. Generally affects people later in life but can occur anytime. There are two types - wet and dry (most common). The wet variety often develops from the dry and is accompanied by bleeding.

Becker's: Similar in presentation to Duchenne's but progresses at a much slower rate and is certainly an inherited disorder. Also, heart problems are not as common. Most people are able to walk until around 25-30 years. Women rarely develop symptoms.

Limb-Girdle: Can present anytime from child to adulthood. Affects the muscles surrounding the shoulders and hips. Slow progression. Heart problems can occur in later stages.

Myopia: Short-sightedness (inability to see things far away). Occurs if the eyeball is too long or the cornea has too much curvature. As a result, the light entering the eye isn't focused correctly and distant objects look blurred.

Nystagmus: An uncontrolled movement of the eyes - usually from side to side but sometimes can swing up and down or in a circular motion. Related conditions include cataracts, glaucoma and albinism.

Optic Nerve Disease: Wide range of diseases all causing some form of damage to the optic nerve

Retinitis Pigmentosa: A genetic eye disease causing damage to the retina. The rods, which control night vision, are most affected. As the disease worsens, the peripheral vision is also lost (tunnel vision) followed by central vision as well. It occasionally, but not often, leads to complete blindness.

Tunnel Vision: A loss of peripheral vision which can be caused by many factors including, but not limited to ... blood loss to the brain, tumours pressing against the optic nerve, exposure to certain toxins, retinitis pigmentosa and other eye diseases.



tunnel vision

RED FLAGS - PHYSICAL AND VISUAL IMPAIRMENTS

Albinism:

Super-sensitive to light and sunburn

Amblyopia:

Varying degrees of visual impairment - inability to focus

Cataracts:

Extreme sensitivity to bright lights

Colour Blindness:

Instructor/Guide may need to wear a certain colour bib. Student may not be aware of coloured hazard signs.

Detached Retina:

Blind spots

Diabetes:

Fatigue - Frostbite/Circulatory issues - possible visual impairments
 - seizures - thermoregulation - Check they self-regulate their insulin
 - Be aware of possible needles associated with auto-regulating insulin packs - Bring sugar or other sweets/fruit/juice

Diabetic Retinopathy:

See: Diabetes - blurred vision

Glaucoma:

Primarily lacking in peripheral vision but may be as severe as tunnel vision

Macular Degeneration:

Loss of central vision - can range from slight blurring to a complete blind spot

Multiple Sclerosis:

Debilitating fatigue - poor stamina - balance issues - possible visual impairments - often function better in colder conditions and worse in hotter - speech problems - slow reaction time - difficulty organizing thoughts - ability can vary drastically day to day - bladder/bowel problems - disorientation - lability or mood swings

Muscular Dystrophy:

Fatigue - stiffness - ability may vary day to day and will progressively recess - poor muscle tone - loose joints - take care lifting after falls so as not to cause a dislocation - possible heart and respiratory problems - inability to relax certain muscles after prolonged use (take frequent breaks to avoid seizing muscles). Possible vision impairments.

Myopia: May require glasses or contacts

Nystagmus:

Wide range of visual impairment - can vary throughout a day - is affected by emotional and physical factors (stress, nerves or unfamiliar surroundings) - easily fatigued - often one angle of vision is easier for them to see through - reduced depth perception - balance problems - confidence issues -

Optic Nerve Disease:

Reduced sharpness of vision - reduced field of vision - impaired colour vision - less sensitivity to bright lights - diminished sensitivity to contrast

Retinitis Pigmentosa:

Loss of night vision - loss of peripheral vision (can be as extreme as tunnel vision)

Spina Bifida:

Possible latex allergy - balance problems - bowel/bladder control - possible presence of Harrington's rods (reduce impact wherever possible) - sensitivity of lesion area - possible shunt (wear a helmet but be sure not restrict flow) - lack of feeling in lower leg region (be careful when fitting boots) - frostbite - curvatures of the spine (scoliosis [side-to-side], kyphosis [hunchback] or lordosis [sway or saddle-back])

Stroke / Traumatic Brain Injury (TBI):

Distorted perception of reality - possible seizures - balance problems - possible shunts - intellectual impairments - speech impairments - visual impairments (blind spots) - MUST wear helmets (be mindful of shunts when fitting) - possible inappropriate behaviour

Tunnel Vision:

Zero peripheral vision

COGNITIVE DISABILITIES

The definition and range of cognitive disability is broad. Persons with cognitive disabilities may have difficulty with various types of mental tasks either from disorders, birth, disease or injury.

Developmental delay are a group of disorders defined by diminished cognitive and adaptive development. It is a disability characterised by significant limitations both in conceptual functioning and in adaptive behaviour, which covers many everyday social and practical skills.

Many cognitive disabilities have a base in physiological or biological processes within the individual, such as a genetic disorder or a traumatic brain injury. Other cognitive disabilities may be based in the chemistry or structure of the person's brain.

Persons with more profound cognitive disabilities need assistance with aspects of daily living. Persons with minor learning disabilities might be able to function adequately despite their disability, maybe to the point where their disability is never diagnosed or noticed.

ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD)/ (ADD) ATTENTION DEFICIT DISORDER - two of the most common mental disorders. ADHD is a medical condition affecting a person's ability to focus, sit still, and pay attention. They may have difficulty in focusing on tasks or subjects, or act impulsively; they may also get into trouble. ADHD begins in childhood, but may not be diagnosed until the person reaches adolescence or even adulthood.

BRAIN INJURY There are a number of causes of brain injury, including Stroke, illness, Traumatic Brain Injury (TBI), brain tumours, and Meningitis, among others.

Each brain injury is unique - there is no reliable way to predict how an individual's brain will be affected by a particular injury. Once a person's brain has been injured, health care providers perform a number of different

psychological and neurological tests in order to determine the areas of the brain that have been damaged. With some brain injuries the damages done and the result in behaviors are barely noticeable. In other brain injuries the damages and affects are more extensive. The extent of the injury to the person's brain determines the outcome of the person's ability to process information.

GENETIC DISABILITY

Genetic Disabilities such as Down's syndrome, Autism, and Dementia, affect people individually. Some persons with these disabilities are able to function at higher levels than others.

Developmental Delay – A term that is used to describe a child's development that is slower than that of other children of the same age, particularly when the cause is not clear. It can affect any area of development including gross and fine motor skills, speech, language, cognition, social and emotional skills.

Down Syndrome – A genetic disorder involving abnormalities in the body's 21st chromosome. The three variations it can take are 1) Trisomy 21, in which the child has an extra copy of the chromosome in all of their cells. It is caused by abnormal cell division during the development of the sperm or egg cell. 2) Mosaic Down syndrome is similar to Trisomy 21 but not all of the body's cells contain the extra chromosome. The abnormal division occurs after fertilisation. 3) Translocation Down syndrome occurs when part of the chromosome becomes attached to another chromosome before or at conception; and is the only form of Down syndrome that can be passed from parent to child. All forms are characterised by distinct facial features (small head, flattened features, protruding tongue, unusually shaped ears). Most people with the disorder are very lovable and loving ... enjoy physical contact ... but do not assume they are all the same person just because they share a similar appearance.

Fragile X Syndrome – The most common form of inherited intellectual impairment. It occurs when the Fragile X Mental Retardation 1 (FMR1) gene mutates. This gene normally makes a protein required for brain development. Effects can range from learning disabilities to more severe cognitive/intellectual disabilities. Can exhibit autistic-like behaviours, speech and language development delays.

Autism – A developmental disorder that is characterised by impaired social interaction, problems with verbal and nonverbal communication and unusual, repetitive or severely limited activities and interests. Essentially it means to ‘be inside oneself’ – most people who have it do not understand or conform to common societal bounds. There is a huge range in severity. It is the original disorder within the umbrella of the autism spectrum disorders.

Asperger’s Syndrome – Falls within the autism spectrum disorders. It affects the way a person makes sense of the world, processes information and relates to other people. Difficulties are seen most in the areas of 1) social communication 2) social interaction and 3) social imagination.

Rett’s Syndrome - A neurodevelopmental disorder that falls under the autism spectrum disorders. It is characterised by normal early development followed by the loss of hand control and ability to speak, decrease in muscle tone, slowed brain and head growth, gait abnormalities, seizures and mental retardation. It is generally found only in females.

Stroke / Traumatic Brain Injury (TBI): These are both injuries to the brain. A TBI is caused by an external force and can be either open (involving an open wound) or closed (blunt trauma with no wound) while a stroke is caused by internal factors and would be considered an acquired brain injury (ABI). Hemiplegia is often a result.

RED FLAGS - COGNITIVE

ADD/ADHD: Problems sustaining focus – easily distractable – problems with motivation, continuing the same task – emotional fluctuations – short-term memory issues – self control problems – zoning out – inability to delay gratification – inappropriate behaviour and/or speech – acting impulsively – difficulty waiting in lines - hyperactivity

Autism: Unexplainable outbursts – verbal or non-verbal – physical aggression – seeming to be lost in space – having conversations with self – unaware of consequence for action - may not like to be touched – may not like direct eye contact ... or may need it to hold focus – difficulty focusing on one task for too long – inappropriate social behaviour – self stimulation (eg. hand flapping)

Asperger's Syndrome: Difficulty understanding gestures, facial expressions and tone of voice – can be very literal ... will not typically understand sarcasm or metaphors – difficulty waiting in line

Developmental Delay: Verbal or non-verbal – distractable – uncoordination – poor balance – information retention problems

Down Syndrome: Poor muscle tone – excessive flexibility – loose joints – possible heart problems – possibly inappropriate social and sexual behaviour

Fragile X Syndrome: May also have other intellectual impairments – loose joints – flat feet - behaviour issues – inattention – poor eye contact – flapping or biting hands -can be aggressive or very shy – distractible – may be a runner

Rett's Syndrome: Balance problems – speech problems – severe uncoordination –hand biting – lack of general motor skills – may walk on toes – wide gait – seizures – breathing problems - self stimulation