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GUIDELINES FOR TRAINING TEACHERS AND COACHES IN SKI ACTIVITIES FOR PERSON WITH DISABILITIES

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INTRODUCTION

1.1 PARTNER

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www.spinabifidaitalia.it

ASBI ONLUS

The mission of ASBI is to promote activities in the medical and scientific forum for the prevention, treatment and rehabilitation of Spina Bifida and Hydrocephalus, not excluding similar disability and facilitate the social and occupational integration of people with these disabilities.



www.ifglobal.org

IF SBH

IF is a global umbrella organization (est. in 1979) of associations, professionals and individuals who are in one way or another touched by spina bifida and hydrocephalus (SBH) and their families in 1979.

IF's three main strategic objectives are concentrated in the areas of primary prevention of neural tube defects through folic acid supplementation/food fortification, right to health of all persons with SBH, and building of a strong united community of the SBH family, celebrating the achievements of persons with disabilities and supporting self-advocacy of young disabled persons.



www.monosci.it

FREERIDER SPORT EVENTS

FreeRider is a sport organization that aims to make possible the combination of physical disability and winter sports.

The primary objective behind FreeRider is the integration of people with disabilities through skiing, practiced with the necessary training and equipment.

FreeRider wants to bring new people to skiing and simultaneously completes the training for those who practice this activity through advanced methodology and rich in content, tested and proven over the years by the staff FreeRider, made up of teachers, technicians and highly qualified people.



www.handyclub.cz

HANDY CLUB - OSTRAVA

They're focused on different topics. The first and the most important one is to reduce the barriers which keep common society and disabled on two different positions.

On the other side they do research, analytic and educational tasks which help us to spread out information about disability.



www.faiponline.it

FAIP ONLUS

Faip (Federation of Italian Para-Tetraplegic) is a social association and a Non- Profit Organization of Social Utility, which has membership of 19 associations spread throughout the country.

The commitment of the Federation has been up to know to help build a bridge between the needs, rights, and aspirations of people with spinal cord injury and a real chance to regain the dignity of being able to live in the private and in the community as all other citizens, through efficient services, and serious avenues of research and social inclusion.

SKIFORALL: Guidelines for best practices on Sport, Disability and Education among young people in Europe

The Skiforall project is a Small Collaborative Partnership funded by the Program Erasmus+. Different European partners: IFSBH (International Federation Spina Bifida and Hydrocephalus, Belgium), Freerider Sport Events (Italy), FAIP (Federazione Associazione Italiana Paraplegici), Handy Club (Czech Republic), Active Therapy (Poland) connected by activities related to sport, disability, inclusion and education have been working together for almost two years in order to produce the guidelines that you are about to read. These guidelines are issued by several actions and perspectives that ASBI (Associazione Spina Bifida Italia) shared with all the partners involved.

ASBI is the Italian national non-profit organization that has worked for 30 years with people with Spina Bifida and Hydrocephalus, a chronic and congenital malformation that can lead to different kind of consequences and physical disabilities. ASBI desire is to develop an approach oriented to the improvement of the independence of people with physical disability, especially youngsters. Since 2012, ASBI has considered sport an important tool in order to increase young people self-awareness, self-esteem and autonomy. This is the reason why it organises Summer and Snow Camps where young people with Spina Bifida can practice several sport activities (ski, handbike, basket, rowing, tennis, etc.) and learn their own potentialities in despite of disability. These sport camps are mixed, so that young people with disability and without disability participate together to sport activities and the same trainers are people with disability as well.

The management of Sport Camps was actually a best practice that ASBI wanted to extend to the other European partners, to promote and share its way of conceiving sport as a tool, which helps developing autonomy, allowing the inclusion of disabled people in society, out of national borders.

The SKIFORALL project aims to connect several realities working with disability and young people on many levels triggering both the sportive side and the educational side. The objective of the project is to train the trainers and bring a better inclusion of disabled young people within schools and sportive realities.

The project is focusing on:

- Training of ski coach to ski with disabled people
- Education/awareness campaign in schools, among students and teachers, transmitting the importance of inclusion of young disabled people in school sportive programs

All the partners have been involved in the project because of their skills and especially:

- Sportive skills;
- Inclusion of disabled people in school and society;
- Communication and presence of a European network about disability;
- Educational and training skills.

Sharing all these skills led the partners to produce these guidelines issued by a European teamwork useful for schools, ski coaches and trainers. They will be useful in sportive programs in schools for disabled youngsters and in ski training for disabled people. This could enlarge inclusiveness and accessibility in sport, empowering people's quality of life.

The guidelines are divided into three parts:

1. Notes on disability
2. Methodology for ski coaches
3. Feedback from the project

These three parts are considered fundamental in order to gather precisely the whole outcomes of the project. The first part gives a general overview about disability and sport, the classification and the injuries connected to physical disability.

The second part is more practical: there are illustrated ski lessons for disabled people, focusing on dualski and monoski methodology.

The last part is reserved to the feedback gathered from the stakeholders met during the life cycle project: trainers, coaches, students and operators.

We are convinced that these guidelines could give to teachers, ski coaches, schools and sportive operators a know-how concerning ski, disability, physical activity and inclusion programs in schools and sport associations.

Ski For All is a European Project of the Erasmus+ Sport program based on a small collaborative partnership which involves four countries: Italy, Poland, Czech Republic and Belgium. Six different organisations collaborate around the themes of sport, disability, education and social inclusion. Participation in sports and in society as a whole is a fundamental right of the child, regardless of health status or disability.

For children born with lifelong disabilities such as spina bifida, which can result in varying degrees of paralysis, being physically active is of the utmost importance to reduce the risk of obesity and other health-related issues (e.g. pressure sores, diabetes, cardio-vascular disease, osteoporosis). However, youth with spina bifida may be at higher risk of physical inactivity than typically developing youth. Apart from reduced mobility, the reasons for lower levels of participation in physical activity among children with disabilities are complex and multifactorial. Family support is crucial.

Taking part in inclusive sports also plays an important part in the mental health of children with physical disabilities. Being able to learn new skills, being able to achieve personal goals, while having fun with other children, greatly contributes to enhancing feelings of self-esteem and well-being.

Research has shown that physical activity can increase the physical, emotional, and social well-being of children with spina bifida, as well as increasing their functional independence, integration, and quality of life and positively impacting their future health. An increased awareness of and focus on providing appropriate equipment and adapted sports in the child's own environment by policy makers might increase physical activity levels.

As established in article 30 of the UN Convention on the Rights of Persons with Disabilities (UN CRPD), countries that have ratified the document should actively promote the participation of persons with disabilities in sports and physical activities. Implementing the Ski For All project is a great way to achieve this.

In addition, the 'Ski For All' project and its guidelines are an excellent example for countries to prepare young people for an inclusive society, by offering children - both with and without disabilities - a sports activity that they can enjoy together. Learning new skills and building friendships in a safe environment contributes to personal development, which will benefit participants in all areas of life.

1.4 INTRODUCTIONS TO THE GUIDELINES

Premises:

“All children, even those with disabilities, have the right to participate in the cultural life, recreation, leisure and sport activities” and “a civil and responsible community must take on the responsibility of ensuring these children with equal access to all those activities ”

- Art. 30 of the UN Convention for people with disabilities.

We believe that skiing with one's family, friends and classmates cannot remain just a desire, but must become a concrete and global opportunity of growth and inclusion for all children and young people.

If sport is practiced with enthusiasm and commitment, it can make everyone reach unexpected results, by overcoming limits and discrimination, and generating social inclusion. It helps to express physical, cognitive and relational abilities, in situations of freedom and psychophysical well-being, through sharing moments of socialization.

The “Ski4all” project aims at the creation of a manual/ guidelines that could provide appropriate information on both the pathology and the most appropriate teaching technique. This will be provided to those instructors who want to teach people with motor disabilities such as spina bifida.

For example:

“In Italy the figure of the ski instructor was legally recognized with the law n ° 81 of March the 8th, 1991. This law acknowledged the existence of a Register of ski instructors, in which those who want to practice must enroll. Currently, as far as teaching people with disabilities is concerned, the ski instructor must obtain a “Specialization in Teaching People with Disabilities” by attending a course. This Specialization Course, held in the various Regional Colleges, enables the Instructor to teach all the disabled people who ‘physically’ can ski (seated, blind, amputees, sensory disabled etc.). Regarding the seated ski, the figure of the “seated” ski instructor is not yet contemplated in the Framework of Law. ”

However, since the demonstration-phase is one of the cornerstones of any ski lesson, some associations such as Freeriders Sport Events, employ a Ski Instructor (who acts as the Courses Manager), alongside with a seated demonstrator (former experienced athletes, ex Paralympics athletes, former ski instructors) to better demonstrate and facilitate the student in understanding how to apply the technique.

The instructor...

The “instructor” will have to place the person in the condition of learning how to ski, in a state of maximum safety and by wisely considering the student's full potential. He/she will have to strive to guide the student's improvements, help the person expressing him/herself and his/her abilities, by carefully considering the student's achievable desires and dreams. The instructor will have to give full responsibilities to the student, by instilling confidence and proving himself ready to correct the effects of the most serious mistakes.

Therefore, the essence of the role not only concerns the possession and the following transmission of techniques. But it rather implies the demonstration of empathy, a behavioral

style and relational abilities, throughout the whole experience, to make each process as much sustainable and understandable as possible.

Multidisciplinary sharing

If the teaching falls under a rehabilitation program, the results must be reported to the specialists and professionals (doctors, psychologists, nutritionists, teachers, etc.) who works for the subject and who could also be consulted for a possible collaboration in the first place.

The topics that will be covered are the following:

- Outline on disability
- Sport and Rehabilitation
- History of skiing for disabled people
- Equipment
- Preparation
- Training

Chapter 2: information on the pathologies to be better able to recognize the motor / functional residue of our student

- The spine
- Spina Bifida, Spinal cord injuries and different pathologies
- Manifestation of the pathology on a physical level

The functional classification, concerning the evaluation of our student to define the possessed skills in order to implement the teaching method (sitting or standing)

Chapter 3: Bioengineering and the available equipment to give everyone the opportunity to ski

- Knowledge and testing of all types of equipment available on the market today;
- Assignment of the equipment and its related uses based on the residual movement / skill
- Actualization of a better posture in order to make the most of the motor residue
- Use and adjustment of the composing parts (shock absorbers, ski lift and chairlift systems etc.)

Chapter 4: how to prepare ski lessons, helps and tips

- Actualization of a better posture in order to make the most of the motor residue
- Realization of a card for equipment supply and pre knowledge of the student.
- Preparation, selection of ski material, Tips....

Chapter 5 Teaching techniques, main technical terminology, lessonplanning methodology and exercises:

BEGINNER level

- Choice of the most suitable material / equipment.

- Equipment explanation
- Acclimatization using various exercises and using the equipment
- Definition of goals, times and skills to be developed for progression
- Choice of the slope

MEDIUM level

- Choice of the most suitable material / equipment (improved competitive equipment)
- Definition of goals, times and skills to be developed for progression
- Choice of the slope

ADVANCED Level

- Choice of the most suitable material / equipment (improved competitive equipment)
- Definition of goals, times and skills to be developed for progression
- Choice of the slope

The following topics are addressed at all levels:

- Handling of the disabled person on the snow
- Safe use of the ski lifts and chairlifts (in reference&link)
- The importance of using sports analysis software (in reference&link)



2

SPORT AND DISABILITY: DEFINITION, CLASSIFICATION, ANATOMIC AND MEDICAL NOTES

2.1 DISABILITY

Impairment:

Loss or abnormality that may be transient or permanent.

The impairment represents the externalization of the pathological state.

Menomations are generally subdivided into 4 categories:

- Motor-Type impairments
- Hearing impairments
- Visual Impairments
- Organic Impairments

Once the disability is identified, the nature of the damage must be clarified.

Disability:

Any restrictions or deficiencies (deficit) that impairs, limits or interferes with a person's ability to engage in certain tasks or actions or to participate in the typical daily activities. These conditions makes ordinary activities more difficult than they are for other people. Such distinction becomes therefore meaningful in the comparison with what is considered to be normal/typical.

Handicaps:

The handicap is the social aspect of the disability. It reflects the social, economic and environmental consequences experienced by the individual, caused by the presence of such impairment or disability

2.2 SPORT REHABILITATION

Sport:

In the present context, sport is intended as any game or exercise that, limited by rules, have an hygienic, educational and aesthetic significance for its participants.

We believe that sports must include fun and entertainment.

Nonetheless, we are aware that for many this is not the case, as sport represents, for them, a struggle against one's self, in the continuous search for the overcoming of one's own limits. Disregarding such differences, we believe that everyone can find the motivation to practice sport in the most suitable way to their personal interests and values.

It is indeed in this context that rehabilitation becomes valid and important.

Rehabilitation:

By rehabilitation we intend everything that contributes to a physical, social and psychic restoration of the normal activities in the individual's life.

By definition, rehabilitation indicates any intervention towards one's disability, usually after a menomation.

We believe that such definition does not only refers to the recovery of any physical capacities but also to any interventions from which the individual's life would benefit and that would restore the individual's ability as a whole.

Sports and Therapy:

In this context, sport is intended as a therapeutic moment within a precise rehabilitation plan, that can be used both in hospitals and in other external environment.

In rehabilitation centers, sport is used as a therapy to vary the activities and type of work that the patient would normally perform in.

2.3 SPORT AND DISABILITY: HISTORY

The practice of alpine skiing by disabled people began to spread after the Second World War.

They were mainly the disabled of war: soldiers and civilians, who tried to go back to skiing, using prostheses, crutches and other equipment often invented and built directly by them. In Austria, considered the homeland of Alpine skiing, the first pioneers were starting this practice, including Sepp Zwicknagl, who experimented with prosthesis skiing after undergoing amputation of both legs.

The first documented competition for disabled skiers was held in 1948 in Badgastein with 17 participants.

A notable impulse occurred during the 1970s. With the introduction of modified slides, Monoski and skibob, alpine skiing became practicable also by paraplegics and other wheelchairs users.

In 1976 the Paralympic Winter Games were held in Örnsköldsvik, Sweden.

In that edition, there were men's and women's races of giant slalom and slalom for both standing and visual disabled.

In 1982 the Paralympic Winter Games were held in Les Diablerets, Switzerland, where the first world championships of downhill skiing for disabled was introduced.

Since then the event is repeated at four-year intervals.

In 1984 the free descent was added to the Paralympic programme, and in the Lillehammer 1994's edition was the turn of the supergiant.

The seated category, which was present only at the demonstrative level in 1984, was included in the medal races in Nagano 1998.

The International competitions are organised by the International Paralympic Alpine Skiing Committee (IPASC), which is one of the division within the International Paralympic Committee (IPC), established in 1989.

In Italy, the competitive activities are organized by the winter sports department within the Italian Paralympic Committee (CIP).

The rules of the International Ski Federation (FIS) are valid for the main competitions and supplemented by specific provisions dictated by the IPASC.

Competitions are held in all Alpine specialities (downhill, supergiant, giant slalom, slalom, combined) and skiers are categorized according to the type and degree of disability.

Alpine skiing in its various specialties can also be practiced by people with physical or visual disabilities.

The equipment should be adapted to the functional ability of the sportsman, who can use normal skis, a sled mounted on skis, stabilizers or orthopedic prostheses, as appropriate. People with blindness or low vision can ski accompanied by a guide that precedes them on the track, giving them vocal directions on the path to follow.

2.4 CLASSIFICATION OF DISABILITY AND SELECTION

Official Classification:

The classification used by the International Paralympic Committee (IPC), distinguishes alpine skiers in three main groups based on the type of disability, with further breakdown by degree of disability:

Basic glossary:

- B = Blind (B1 - B3 = Degree of blindness).
- FIS = International Ski Association (Fédération Internationale de Ski),
- ICC = International Coordinating Committee (founded in 1982).
- IPC = International Paralympic Committee (founded in 1989).
- KREK = Kreative Rennergebnis Kontrolle (Creative Race Result Control).
- LW = Low Winter (Classification of Disabled Standing or Sitting).
- Approval = in accordance with the FIS regulations, an approval consists in the acceptance procedure for a competition location, which must correspond to specific technical and infrastructural requirements.
- RHC = Realistic Handicap Competition System (RHC - KREK System).

Categories and Classes:

The categories are adapted from time to time to meet the requests that are discovered during the race.

The deaf, who suffers from balance and orientation problems, have, for historical and organizational reasons, their own competitions, as well as the mentally handicapped, who take part in the Special Olympic Games.

The Blind Category (visually impaired)= have a wake guide in front of or behind the athlete, giving them instructions via radio.

- Class B1: totally blind;
- Class B2: severe visually impaired;
- Class B3: visually impaired with good residual capacity.

For totally blinds participants, connection via intercom or the use of a megaphone is provided. Visually impaired people use normal ski equipment and compete with a guide. For them the only physical presence of the guide can be sufficient without any other special equipment.

The Standing Category = this category includes skiers with physical disabilities who are able to stand (at least) on one leg, even with the use of prostheses.

People with disabilities in the upper limbs ski without poles, or with a single stick.

Those with disabilities in the lower limbs can use two skis, resorting to prosthesis, or on a ski only replacing the normal poles with outriggers, which instead of the tip have a small ski

and help maintain balance.

- Class LW1: amputees above the knee;
- Class LW2: skiers with outriggers;
- Class LW3: amputees of both limbs below the knee;
- Class LW4: skiers with prostheses;
- Class LW5 / 7: skiers without sticks;
- Class LW6 / 8: skiers with a sticks;
- Class LW9 / 1: disability of arm or leg (post-amputation);
- Class LW9 / 2: arm or leg disability (cerebral palsy).

The Sitting Category = This category includes skiers who, due to paraplegic or double amputation, are unable to stand. Instead of skis, they use a tool called monoski or sit-ski, consisting of a seat mounted on a ski and equipped with suspensions and special slings. Instead of the sticks they use the outriggers.

- Class LW10: monoski (high degree of paraplegia);
- Class LW11: monoski (low degree of paraplegia or amputees of both limbs above the knee);
- Class LW12 / 1: monoski (low degree of paraplegia);
- Class LW12 / 2: monoski (amputees of both limbs below the knee).

Selection Phase:

Each disabled person is assigned to a category after a prior visit made by a physiotherapist or another doctor recognized by the IPC.

The visit aims to document the physical abilities of an athlete for a specific race. In this sense, neurological deficits are a determining factor for wheelchair athletes.

The degree of visual impairment is instead determined by an ophthalmologist and the classification is made after such diagnosis.

Blind people are often forced to wear completely obscured ski goggles. Limited cases of difficult placement, finally, are classified following the observations made during the competitions.

In fact, physiotherapists, present during the course of the competitions, examine the participants at regular intervals, for any possible change in their disability.

With the same classification, in the race wins the competitor who has scored the shortest time without having skipped any gate.

If in some categories there are few participants, the organizers may decide to establish a unified category; in this case, the times are mediated with a conversion factor, which takes into account the different classification of the competitors.

The handicap system:

The RHC-KREK system (realistic competition of handicap and creative control of race results) is globally recognised and aims to evaluate the various classes of disability equally through

the attribution of a category-specific factor that certifies the degree of possible capacity related to the type of disability.

To simplify it, one can consider the example of a person with a more serious disability, who while taking a longer downhill time, compared to another athlete with a different and less serious disability, may still win the race.

This could happen if the first competitor results faster in the comparison between the results of the proportions of the two factors and the respective times.

FIS Regulation and Authorization for persons with disabilities:

All world and European cups are carried out according to the current FIS regulations, extended to IPC and the World Cup committee for downhill skiing for the disabled.

If, however, in exceptional cases, a race track does not meet the minimum demand of the FIS in altitude and length, the World Cup committee together with the leaders of all participating countries, can verify and evaluate the modifications.

In this way, a regular and valid race for the World Cup for the disabled can be carried out on a track, even if this has not been approved by the FIS.

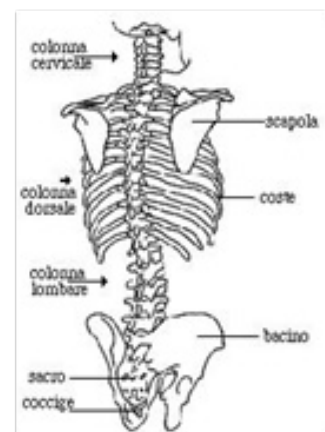
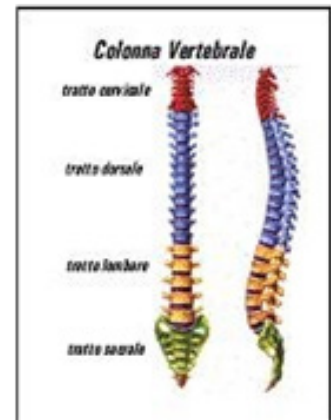
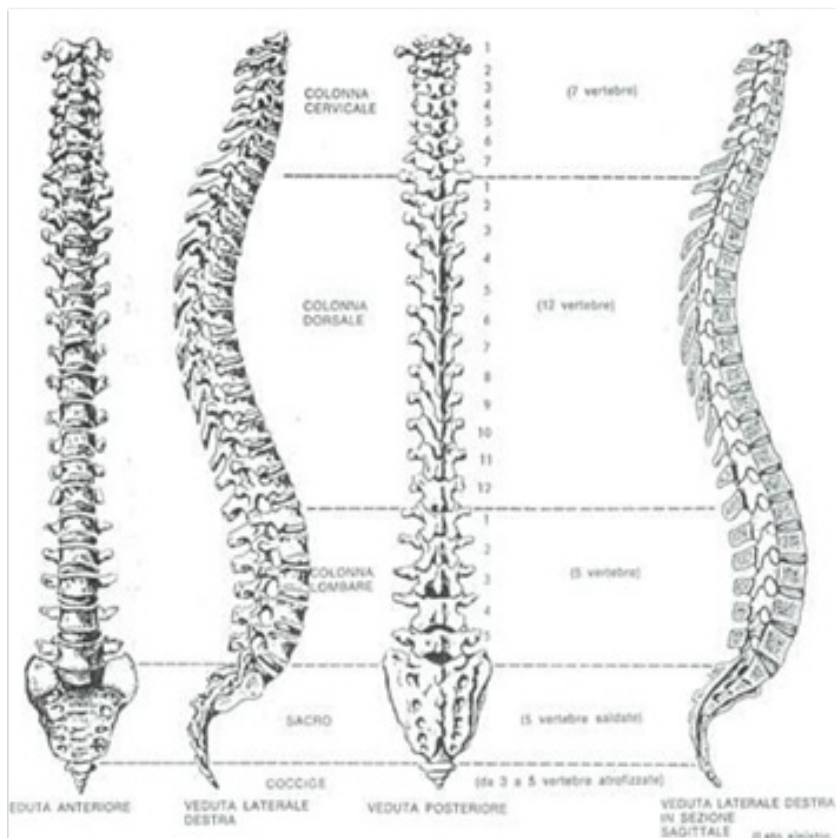
The World Cup:

While the slalom, the Super G, and the Super combined can be performed on any track, the technical requirements for downhill are greater. In fact, there must be no big jumps, ripples or bumps on the runway.

The downhill is also challenging from an organizational and economic point of view. In fact a greater involvement of the athlete is required. His presence is in fact required for three days: one to inspect the track, one for the time trial and a third one for the actual race.

2.5 ANATOMY AND DISABILITY: INJURIES AND ISSUES

The Spine:



It is the central support of the body, it is made up of 33-34 superimposed bone elements called vertebrae (vv.) characterized by different shapes depending on their functions. In the column we distinguish 5 regions in which the vv. have similar characteristics:

- Cervical region: formed by 7 vv. that support the head and allow its movements.
- Thoracic or dorsal region: formed by 12 vv. on which the ribs are articulated and form the rib cage.
- Lumbar region: formed by 5 vv. larger in size than the others, in fact they support most of the weight of the body in an upright position.
- Sacral region: formed by 5 vv. welded together to form the sacrum bone on which the pelvic bones are articulated.
- Coccyx: formed by 4-5 vv. merged with each other and extremely reduced.

A generic vertebra has a cylindrical body consisting of compact bone tissue; posteriorly there are the so-called vertebral arches, whose juxtaposition has the effect of delimiting the vertebral canal inside which the spinal cord is housed.

The nervous system

It distinguishes itself in the Central Nervous System (CNS) and Peripheral Nervous System (SNP). The first is composed by the brain or encephalon and the spinal cord; the second is formed by the nerves.

The Brain is that part of the CNS contained within the skull, that connect the cerebellum and the spinal cord, it is covered by 3 membranes called meninges, it processes information coming from the body and from the environment, triggering chemical, motor and behavioral responses.

These functions are performed by 100 billion nerve cells called neurons.

The spinal cord has an almost cylindrical shape flattened in an anteroposterior direction and extends from the atlas, first vv. cervical up to the body of the 2nd vv. lumbar, for a total length of about 45 cm.

Below the Medullar Cone there are a large number of nerves that take on an arch shape and are therefore called cauda equina.

The essential function of the marrow is to first collect the environmental stimuli and transmit them to the cerebral cortex, and consequentially to re-transmit the processed responses to the periphery systems.

The Peripheral Nervous System is formed by 31 pairs of spinal nerves whose roots are distinguished in anterior (or motor) and posterior (or sensory) ones.

The anterior root has a role of conducting the stimuli coming from the brain or the marrow towards the muscles, the posterior one conveys the stimuli from the body to the CNS.

The nerves that enter and leave the marrow are numbered like the vertebrae that pass through it.

In addition, there are 12 pairs of cranial nerves.

Spinal cord injuries

1) SPINA BIFIDA

Spina bifida is a birth defect in which there is incomplete closing of the spine and membranes around the spinal cord during early development in pregnancy.

There are three main types: spina bifida occulta, meningocele and myelomeningocele. The most common location is the lower back, but in rare cases it may be the middle back or neck.

Occulta has no or only mild signs. Signs of occulta may include a hairy patch, dimple, dark spot or swelling on the back at the site of the gap in the spine.

Meningocele typically causes mild problems with a sac of fluid present at the gap in the spine.

Myelomeningocele, also known as open spina bifida, is the most severe form. Associated problems include poor ability to walk, problems with bladder or bowel control, accumulation of fluid in the brain (hydrocephalus), a tethered spinal cord and latex allergy.[2] Learning problems are relatively uncommon.

2) MIDOLLAR LESION:

It occurs when the functional connection, between the upper centers of the CNS and the peripheral nerves, is partially or totally interrupted in the spinal cord: this type of injury leads to different complications.

A spinal cord injury has in fact repercussions on the whole organism as the trauma that originates on the marrow causes a lack of connection between the nerve fibers; therefore causing paralysis, loss of viscera control, loss of reproductive function, loss of sensitivity, etc. The lesion can be complete, if there is a total spinal cord injury, or incomplete, if the damage to the marrow is only partial.

In the first case, there is a total and usually permanent loss of the ability to send sensory and motor impulses, with the consequential loss of functionality below the lesion level. In the second case some motor and / or sensory functions continue to be active.

The type of damage therefore varies from person to person and the effects of an incomplete injury depend on the area of the marrow that has been damaged (anterior, posterior or lateral).

The most common causes of spinal cord injury are traumatic (i.e. the result of a physical injury or trauma that causes a vertebral fracture).

With the exception of drilling lesions (gunshot ...), the causes of traumatic spinal cord injuries are the result of direct lesions or hyper-flexion/extension /rotation/compression forces.

Once the spinal shock phase has been completed, the impact of the lesion on sensory and motor functions can be assessed.

There are different terms to describe the condition of patients after such lesions:

Paralysis: is a generic term used to describe the loss of functions following a damage to the nervous system. Knowing the exact level of the lesion is useful to understand which parts of the body will be affected by paralysis and the severity of the effects; in fact, the greater the spinal cord injury is, the greater the damages are.

The paralysis can be divided into two categories depending on the type of damage that undergoes the marrow, we can either talk about spastic or flaccid paralysis.

Spastic paralysis occurs when the spinal reflexes are still functioning, but the supervision from the brain does not work. In this case the person has frequent spasms, which are violent and sudden contractions of the muscles caused by reactions to normal stimuli.

Flaccid paralysis occurs when spinal reflexes are not active, in this situation there is a loss of muscle tone in the limbs, in the bladder and intestine.

Following this two situations can be distinguished.

Paraplegia: is a term that describes a total or partial paralysis that affects the lower limbs and often the trunk. Paraplegia is the result of damage to the marrow from the T1 vertebra (1st thoracic) down. T1 - T12 lesions affect legs and trunk, whereas L1 - L5 lesions affect the areas below the waistline.

Tetraplegia: is term describing a total or partial paralysis from the neck downwards involving the 4 limbs and the trunk. The diaphragm is connected to the medulla through

nerve fibers that branch out between the C3 - C5 vertebra, therefore in the case of lesions above this level, mechanical ventilation may be required.

3) STROKE or HEART ATTACK:

Often deadly brain damage caused by a blockage or hemorrhage of the cerebral blood vessels. Some brain tissues are very sensitive to the suspension of blood circulation even for a few minutes and their rapid deterioration can in fact cause paralysis of the limbs against the side of the lesion area (HEMIPLEGIA).

Stroke manifestations include weakness of the facial muscles, inability to speak, loss of bladder control, difficulties in breathing and swallowing, paralysis or general weakening of only one side of the body.

Among the manifestations of heart attack there are weakness of the facial muscles, inability to speak loss of bladder control difficulty breathing and swallowing general paralysis weakening of one side of the body.

4) MULTIPLE SCLEROSIS:

Neurodegenerative pathology of the CNS, it is presented in different characteristics and different clinical manifestations such as: difficulty in walking, paralysis and blindness. It generally occurs in individuals between the age of 20 and 40 years old and has an unpredictable course. It is caused by an altered immune response of the organism, which causes damages in the myelin sheath that covers the nerve fibers.

Problems related to the various pathologies:

As we have mentioned several times before, all the mentioned pathologies also present many other problems that affect the whole organism.

In particular we will discuss: the urinary tract, bedsores and blood circulation problems as they are those which are put under stress in the practice of disabled skiing.

INCONTINENCE:

It is the inability to retain urine and faeces, due to the alteration of the nervous mechanisms that allow the voluntary control of the opening of the sphincters. In this case a catheter will be applied, which is a thin tube of plastic material that allows the emptying of the bladder. Therefore the choice of times and the place to ski is particularly important to avoid infections and problems.

DECUBITUS SLEEPS:

The skin is the largest organ of the whole body and it protects other tissues by acting as a barrier against microorganisms, water and chemical agents. The skin is also involved in controlling body temperature, and maintaining the right level of hydration. On the basis of the severity of the spinal cord injury, the sensory-reachable information are usually blocked by the skin and therefore pain, pressure or temperature changes are no longer perceived.

The skin becomes therefore more vulnerable to sunburn or sharp surfaces. Following this, also the possibility of having blisters and sores increases, these are lesions caused by the prolonged immobility of the subject, that leads to the reduction of the quantity of blood and relative nourishment in the areas subjected to pressure.

BLOOD CIRCULATION AND THERMOREGULATION PROBLEMS:

the voluntary movement of the 2/4 limbs is altered or non-existent, therefore the so-called pump-muscular is missing. The 'pump-muscular' would normally aid the blood circulation from the peripheral areas of the body to the heart. However, its absence and the presence of gravity causes the stagnation of blood and other liquids in the person's feet and hands. The situation get worse with the rigid external temperatures encountered in the mountains, as blood stagnation coupled with these could facilitate freezing

2.6 SPORT AND DISABILITY IN SCHOOLS

Sport engrains, competitive spirit, and friendship, and there is no doubt that physical strength, endurance, social integration and psychological well-being increase with sports. Understanding the benefits of sports for disabled people cannot be difficult accordingly.

Participation in sport teaches about teamwork, cooperation, working towards objectives and handling defeats and disappointments.

Team sports also enable the disabled to acquire and develop leadership and organisational skills.

On the emotional and psychological levels, sport helps in developing stronger self-esteem and personal sense of worth, and alleviates depression and anxiety.

Inclusive opportunities that are inspiring, accessible and meaningful for all young people is a core principle of the School Games.

Suitable Sport for the Disabled in schools:

Numerous modifications are available to allow the disabled to play a wide range of individual and team sports.

However, the main sports that can be practiced at school are:

- Basketball
- Tennis
- Basketball
- Table Tennis
- Swimming
- Archery
- Handbike
- Rowing
- Ski



3

TRAINING FOR SKI INSTRUCTORS: EQUIPMENT

3.1 SKI EQUIPMENT

3.1.1 MONOSKI/UNISKI

Monoski consists of one common ski (we select it according to the weight and technical level or ability of the skier), which is fixed to the construction with a shell where the skier is seated.

Ski fastening must be strong enough to be able to carry heavy construction with the skier. Construction skeleton is made of aluminium tubes; the shell is made from Carbon, Kevlar or fibreglass.

These materials ensure the passive safety of the Monoski. That means especially safety if the skier falls down.

Active safety is ensured by the good driving characteristics of the Monoski, which is determined by the construction and the use of a good quality adjustable gas-liquid shock absorber.

According to the individual need and ability of the skier there might be fastened fixation belts on the shell, which replace the dysfunctional muscles (abdominal) of the skier and fix the motionless legs against possible undesirable deflection.

Stabilizers ensure the stability of monoski skier. Stabilizers are shortened, specially designed crutches topped with short skis.

Stabilizers are used to keep the stability of the monoski skier, to initiate impulse at the beginning of the curve while skiing in curves and finally to slow down and to stop.

The skis on the top of stabilizers can be folded down so the skiers can also use them as sticks to move easier to the front and back. Also handlebar for instructors can be a part of monoski.



3.1.2 DUALSKI

The Dualski is intended to people who have a lower limb disability. It allows skiing independently with remarkable performances like the best able-bodied skiers.

Easy to ski, it is quickly handled and allows a fast improvement.

The fully suspended frame allows skiing efficiently and it will completely satisfy experienced skiers.



3.1.3 BISKI

The biski and consists of two special skis, which are connected to construction with a seat designed with a larger support surface for a better fit and seat of the skier.

The hydraulic lifter is also a part of biski and it allows bikski to be used on the chairlift.

There are several fixation strips on biski which ensure a perfect and safe fit of the the skier.

The design of biski includes handlebar for instructor which gives him perfect control over the biski and biski skier.



3.1.4 KARTSKI/SNOWKART

Snow’Kart/Snowcart is destined to people who have a lack of strength in the upper body and/or who don’t have enough balance to ski with Uniski or Dualski.



3.1.5 TANDEMSKI/TEMPO DUO GRAND CONFORT

Tandemski is for people who can't ski independently. With Tandemski or Tempo Duo Grand Confort discover ski areas, accompanied by your pilot, family or friends.



3.1.6 STABILIZERS/OUTRIGGERS

Stabilizer / outriggers are composed:

A cord fixed under the handle allows the skier to switch from the ski position to the crutch position, or in return depending on the chosen configuration.

The rubber handle offers comfort and a good handling.

There are several lengths available including a telescopic adjustment.

The armrest is wide and comfortable.

The ski tip angle is adjustable for follow the improvement technique.



3.1.7 SHOCK ABSORBER

The shock absorber is an integral part of mono/Dualski and has the function of absorbing the roughness of the terrain and the load's changes on the tool. It also generates the bending at the end of the curve by its compression and extension at the beginning of the curve, and it further gives comfort to the skier.

Therefore it is very important to have a damper with a personalized spring based on the weight of the user, and adjusted according to the ground on which it is used and the type of snow

There are two main types of shock absorber

Hydraulic Spring shock absorbers:

They come from the motorcycle sector

The research and development sectors have studied a dedicated hydraulics for the use of this damper on ski equipments. These dampers usually present two adjustments (compression and return) or three for the more sophisticated ones (slow compression-fast compression and return).

The system works in an hydraulic way and with the use of gas pressure. The oil and gas are kept separated from a piston called "float". Thanks to the wide range of adjustments, the shock absorber adapts perfectly to the athlete's weight and to his/her skill's level.



Air/Oil Shock Absorber:

Its main characteristic is that of being an oil damper with an inside pump that works with air, and in fact it is known as "air and oil" cushion.

The main features are:

- The fast and practical adaptation to the weight and skill level of the skier.
- Which is done by adapting the air pressure inside the shock absorber through a pump.
- The ease of inflation and deflation of the shock absorber using the pump
- This absorber, compared to the spring ones, does not have the possibility to manage the return.



3.2 SELECTION OF MONOSKI, BISKI, DUALSKI...

Monoski, possibly biski/uniski are compensatory aids that allow skiing to persons with different kinds of physical disabilities.

A chance to do this physical activity allows these people to experience something what would otherwise be inaccessible for them.

It offers them a possibility how to spend their leisure time, to do a physical activity on amateur or a top level in natural environment with other skiers from the common population.

It can be a part of the body and motion rehabilitation, which transfers into health improvement and social rehabilitation, because it can integrate skiers into a group of people with similar interests.

- Monoski is designed for skiers with “lighter” disabilities, it assumes good functioning of the trunk muscles, the functionality of the upper limbs and good ability to coordinate stability and balance.
- Biski/Uniski is adapted to the people with a heavier disability, poor or no trunk control, reduced functionality of the upper limbs, and for those with worse coordination.
- Snow’Kart/Snowcart is destined to people who have a lack of strength in the upper body and/or who don’t have enough balance to ski with Uniski or Dualski.
- Tandemski is for people who can’t ski independently.

	GOOD BALANCE strength in the arms	REDUCED BALANCE strength in the arms	LITTLE BALANCE strength in the arms
ACTIVE SKIER	UNISKI TEMPO UNISKI SCARVER MONOSKI MONOSKI BULLET	TEMPO DUALSKI BISKI	KARTSKI/SNOWKART

	People who can’t ski independently
PASSIVE SKIER	TANDEM SKI TEMPO DUO CONFORT TEMP DUO GRAND CONFORT

3.3 PURCHASE OF MONOSKI, BISKI, DUALSKI.....

For those interested in skiing who need these compensatory aids, there are choices that should be solved before the purchase itself. It is important to try the equipment in practice, both under the guidance of an experienced instructor and just by oneself.

In reference&link section (www.skiforall.eu) you will find the ski schools and shops where you can buy the equipment



4

TRAINING FOR SKI INSTRUCTORS: PREPARATION

4.1 RECOMMENDATIONS FOR INSTRUCTORS

The instructor is very important in Monoksi teaching. The need is his/her good physical condition. But even more important is his/her empathy, the ability to evaluate mono skier health and psychological state and tailor the lesson to it.

While sitting on the chairlift it is good to use the time to consult a few basic things:

- Driving style (not everyone tolerates fast driving, driving through “moguls – small hills”)
- To find out whether all the clothes and equipment suite well and does not cause any pain to mono skier
- To clean ski goggles
- To find out whether mono skier is cold or not
- To make ourselves understood about a break (be careful about mono skier tiredness)
- Humour
- Good mood
- Motivation

In order to have a happy mono skier, the instructor must be happy too. To avoid solving problems directly on the skiing slope, we have some important tips for you:

Shorty: the instructor can use short skis

Climbing seat: if the mono skier does not manage to ride on Poma lift by himself/herself, then the instructor should fix himself/herself to the Monoski shell with a carbineer. It will make the ride on the lift much easier. We recommend a ski alpine climbing seat (it is easier to get in it)

Clothes: it is good to wear bright colours or reflective elements. Our safety and safety of other skiers on the slope is very important. If there is more instructors on the slope, it is good to know where each instructor is, so they can help each other in case of need.

Ski gloves: it is good to have thin finger gloves under the ski gloves. While seating the mono skier, when handling Monoski instructors need to pull their hands out of the gloves. It's prevention for instructor not to get the hands frozen.

Tools: there is often a case that instructor needs tools to fix the mechanism on Monoski, to adapt the ski settings. We recommend having the tools on the slope. It is good to have a waist bag, which you fasten to the Monoski shell or the Monoski handlebars.

Handkerchiefs: it is good to have a pocket of the tissues always with you

4.2 BASE MATERIAL SELECTION

Clothes: when choosing skier outfits for monoski or biski skier we must bear in mind that the skier will move less and therefore he/she cannot heat himself/herself by moving as effectively as healthy skier.

Clothes, shoes and other accessories must be able to keep the skiers warm and protect him/her from bad weather conditions - from very low temperatures to heavy rain, which can be met on the slopes.

The principle is basically the same as for healthy skiers. That is layered clothes, where each layer has its task.

The first layer takes the body sweat away, the second layer takes care of thermoregulation and the third layer protects against the influence of the bad weather. According to us, the most important parameter is water tightness.

The parameter level is given in millimeters of water column, which the material is able to resist.

The more, the better. We recommend at least 10 000 mm for both the jacket and trousers. If the monoski or biski skier falls down or if there is a snow fall, the snow can get into the monoski shell and if the moisture comes through the clothes layers, the skier will feel cold very quickly.

Shoes: because the legs and feet will be protected against the weather by an extra winter bag (fusac), the only task of the shoes is to keep the feet warm. We recommend a higher boots with good thermal isolation, which is comfortable for skiers (snow boots).

A little different is the situation with a skier who uses Monoski with a fixed cover of the lower limbs, into which the shoes do not fit. Here we successfully use feather slippers, which have been developed to increase the thermal comfort in sleeping bags for mountaineers in extreme weather conditions.



Picture 1.5 – snow boots



Picture 1.6 – Foam slippers

Winter Bag (Fusac): breathable, waterproof, wash able and abrasion resistant cover. It increases the thermal comfort of the skier, protects against the bad effects of the weather. Sewn-on reflective patches can improve the visibility of the skier on the slope. For skiers who use Monoski or Biski without a solid foot cover winter bag (fusac) is indispensable equipment.



Chemical heaters (Warm pads): – an excellent help for body parts which can get cold during the stay on the slope. Despite of all the clothes layers. Most often they are used for feet and for palms. The advantage is the long period of heat (up to 8 hours) which protects the skier from serious getting cold on the slope.



4.3 THE EQUIPMENT SUPPLY CARD

Card to collect the general information of the skier

*it will be possible to download the PDF version from the website www.skiforall.eu

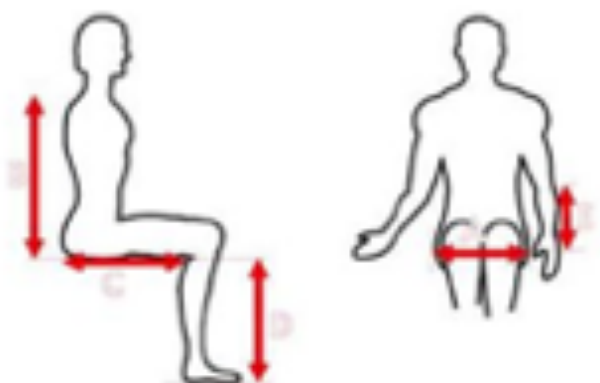
freerider.



SUPPLY CARD EQUIPMENT

Please fill in the following sheet with the instruction below

NAME AND SURNAME _____



- A. MAXIMUM PELVIS WIDTH _____
- B. HEIGHT FROM THE SIT TO THE SHOULDERS _____
- C. LENGHT FROM THE BACK TO THE CALVES _____
- D. HEIGHT FROM THE CALVES TO THE SOLES OF FEET _____
- E. LENGHT FROM THE ELBOW TO THE WRIST _____
- F. WEIGHT (APPROXIMATELY) _____
- G. HEIGHT (APPROXIMATELY) _____
- H. TYPE OF INJURY AND FUNCTIONAL LEVEL _____
- I. OTHER INJURIES CONNECTED TO THE DISEASE _____
- J. TOTAL WIDTH OF YOUR WHEELCHAIR (CM) _____
- K. SIZE FOR POSSIBLE RENTAL OF AN HELMET _____

In case of doubts feel free to contact the responsible of the lessons

DATE _____

SIGNATURE _____

4.4 SELECTION OF SKI MATERIAL

- The width of the Monoski shell – should be chosen according the width of the mono skier's wheelchair. It's a good idea to try the Monoski before going to the slope. It is worth to prepare, adapt, fix and set everything on monoski inside at home where it is nice and warm temperature, not to be cold while doing it on the slope. Do not forget winter bag (fusac)!
- Adjusting the height of the underfoot supply – we have to make sure that the edge of the shell does not interrupt the mono skier back side of the knee. If the placing of the Mono skier legs on underfoot supply is not ideal even after adjusting it, it is good to put an overball to the winter bag (fucas) bottom and adapt the position of the mono skier legs this way.
- Stabilizers - it is good to adjust the height beforehand. Whether the mono skier will use them or not depends on the type of physical disability. It is always good to try stabilizers at least. We always have to support the mono skier to be as independent as possible.
- Ski helmet and goggles – we recommend fixed helmet for mono skier (because of the safety). In cold weather we recommend to put either a thin cap or a hood under the helmet. Always try in advance.
- Ski settings - check the correct settings of the monoski and instructor's skis in advance! Save yourself time and nerves on the slope
- Check the equipment of the Monoski - always check that you have not forgotten anything (seat, carabines, plaster).

4.5 BASIC RULES FOR SKIING

- Safety is on the first place
- Proper preparation (checking the skiing resort - the terrain, arrangement with the skilift operator, to come with enough assistants)
- Introduction of basic ski rules and right behaviours on the slope to the mono skier (mono skier did not have to hear them before)
- Beware of the mono skier physical condition (cold, pain, tiredness)
- Do not make mono skinning too long or too difficult according to the mono skier physical state
- Warm feet
- Clothes (preferably waterproof, thermal underwear, good winter footwear)
- Beware of decubites (seat in mono ski shell)
- Entertainment/fun, entertainment/fun, entertainment/fun
- Goal: Maximise mono skier independence (help only if it is needed)

4.6 PREPARATION

Seating mono skier into monoski, biski, dualski

Move the mono skier preferably in two – hold the mono skier under the shoulders and under the knees and push the monoski backwards under him/her. The third person should hold the monoski. Make sure that the winter bag (fusac) and clothes do not interrupt anywhere (try to avoid the situation if the clothes roll up – most often on the back). Ensure that all straps are fastened properly.

Dry preparation

Dry preparation is the first step before we start to teach. Its aim is to properly set up and adapt ski equipment, coordinate mono skier postures, movements and necessary balance in mono-ski. Ideally, it should be organised inside in a warm and dry environment.

By practicing simulated falls and getting up on the flat surface, we get a good base for driving on the slope itself.

- Falls practise: Hands in the lap, pull the head (chin) to the trunk if the child is afraid to fall down. We simulate the fall by slow laying on the floor or just as a signal
- Getting up: We turn the skier the way that his/her skis are horizontally with the slope, the assistant comes from the side and steps on the ski, he/she grasps the construction and pulls it up to the required position

Backrest fastening and loosening up:

Settings: Ratchet, straps, backrest

Basic position: When skiing, the backrest is pulled (by the ratchet) to the slight forward bend of the mono skier

The backrest and the sitting part of the shell are connected by a joint that can adapt the backrest position differently by using a ratchet. Monoski has got different heights of backrests for increased support according to the disability levels. The upper half of the mono skier body is relaxed when driving on a ski or a chair lift, so the backrest is loosen to relax skier's forward bend.



Foot support setting

The foot support fixed to the shell is set the way that legs are bent and the back of the thighs is nicely placed on the seat.



Stabilisers setting

Setting: Foot support, stabilizers height (right angle in elbow when stabilisers are folded)

Basic position: Stabilizers next to end part of the boots, hands and shoulders relaxed, elbows bent, head up, look forward

Stabilizers resemble crutches topped with the small skis. The height of the stabilizers is adjustable according to the need of a skier. Stabilizers are used in open form for skiing ride, holding the balance and riding on the ski lift. Folded stabilisers are used to move on the flat surface, to the small hill and when turning. The end edges of the small skis are equipped with a toothed small desk, which is used for the slowing down (open-form) and for helping in movement and turning on the flat surface (when folded).



Drag and breaking strap setting – for ski lifts

Check: ratchets, lift strap (it is advisable to have the strap in the cable cover, which prevents the catch of the strap when getting off the lift), carabines, fixable seat

For driving on the ski lift there is a drag strap attached to the monoski seat. Instructor takes the ski lift together with the skier, he/she holds the Monoski handlebar and at the same time he/



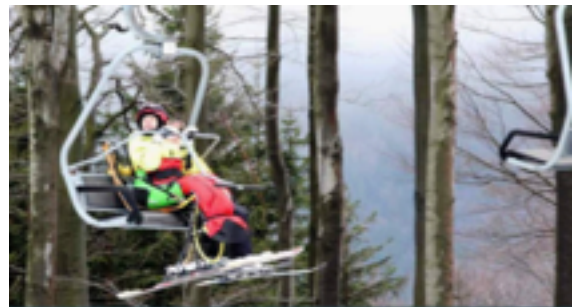
she is belted by his/her climbing seat with the monoski shell. When getting on the ski lift, ski lift operator hitches the hooks into the Monoski drag system. When getting off instructor pulls the dragging system carabine and unstraps the strap. The Monoski gets free from the hook and it allows further movement.

Drag and breaking strap setting – for ski chair lifts

Check: ratches, lock release

Monoski is designed the way that by unlocking the lock the monoski can be bended up and forward to the entrance position above the chair lift seat level. We let the chair lift seat go under monoski. By bending back into the basic position the monoski sits on the chair lift seat. Just after getting on the chair lift, the instructor bends skiers head backwards a little bit to close the safety rails. At the beginning it is advisable to have more assistants who help with monoski getting on and getting off the chair lift.

Before we go to the chairlift for the first time, we should practise everything with the mono skier in advance. The chairlift operator has to know about the mono skier and it is better if the he/she slows down the chairlift when mono skier is getting in and getting off.



4.7 POSTURE

The position of our body in space is called posture. Correct posture corresponds to a suitable skeletal alignment that does not generate muscular tensions, without overloading the joints and without pain.

The information that contributes to maintain a correct posture comes from visual, auditory, vestibular, occlusal (jaw joint), lingual and foot-plant receptors.

A disturbance to only one of these levels, creates imbalances in the whole system and therefore the whole body.

In the particular case of people who have undergone a medullary lesion, good posture favours:

- Comfort
- Equilibrium
- Management of Motor residue
- Pressure distribution on the seat
- Undo cutting Forces

The correct posture on the Monoski is achieved by positioning the person in the correct manner in the Monoski, with the following attentions:

- Choosing the right height of the backrest according to the height of the lesion



- Using a “slow memory” material cushion;



- By correctly fastening all the restraint belts



- Adjusting the backrest inclination (the shoulder must be perpendicular to the center of the attachment)



- Positioning the legs so as to ensure a balance of the trunk even to people with reduced motor residue.

4.8 CHOICE OF A SKI SLOP

- It is important to choose a suitable ski slope for good quality practise. For beginners, we recommend a milder slope that is wide enough.
- We prefer a personal visit to the ski resort to assess the suitability of slopes and to arrange specific questions with the ski resort manager.
- It is important to arrange things directly with the ski lifts operators – to help to get on the lift and to get out of the lift or chairlift.

4.9 TIPS FOR MONOSKI COACHES

- Always make sure that the person on monoski feels comfortable, does not feel cold, tired or does not have any other problem. Although we may think that he/she will tell us when he/she is not fine, there might be other reasons why he/she stay silent and speaks only when the situations get unbearable.
- To prevent decubitus and ensure monoskier comfort while skiing ask or check whether his/her clothes suits well. Especially trousers can slip while disabled person is trying to find comfortable sitting in monoski seat.
- connection with tightening of belts. Legs or body of the monoskier can be tightened more to one side of monoski which will cause that centre of monoskier gravity will not be in the middle and monoskier will have a problem with balance.
- Before going for monoskiing check the accessibility of the place where you want to go. Not only skiing slopes and accessibility of lifts, but also accessibility of toilets, restaurants and cash desk.
- If there is turning tourniquet on the way to the ski lift, check if there is a different free way how to get to the lift. If there is no other way, it will not be probably possible for monoskier to get to the skiing lift.
- Before you enter area of ski lift, check if ski lift operators have got some information or experience how to deal with monoskier on a ski lift. If not, explain them how monoskier can use the lift and kind of help he/she needs.
- The skiing resort and ski lift provider may limit the number of monoskiers in the area. This can be caused by not so strong engine which runs the ski lift or by danger of accident of monoskiers and skiers if the capacity of skiing slope is small and limited.
- The disabled monoskier can be so concentrated on his/her skiing that he/she can miss dangerous situation on skiing slope which would be worth to avoid. For this reason it is better if instructor beforehand agrees with monoskier some kind of signal (f.e. touch the arm twice) which means - stop.
- On the ski lift (poma, anchor type) an instructor should go first before the monoskier. In this way he can always provide a quick help to monoskier in case he/she falls down on the ski lift or he can help the monoskier with getting off the lift



5

TRAINING FOR SKI INSTRUCTORS

5.1 MAIN TECHNICAL TERMINOLOGY

- **ANATOMICAL AXES:** By “anatomical axes” we mean the imaginary lines around which the body movements take place. The main axes of the body are:
Longitudinal axis: it is the imaginary line that crosses the body from top to bottom (from the top of the head to the pelvis).
Transverse axis: it is the line that crosses the body from right to left, parallel to the ground and perpendicular to the longitudinal axis.
Sagittal axis: it is the line that crosses the body from front to back, perpendicular to the other two axes.
- **BALANCE:** Balance is the condition in which the skier finds himself when the resultant of the forces acting on it fall within the perimeter of the ski support base.
- **BASIC POSITION:** It is an ergonomic position that the skier assumes when slipping which allows him/her to maintain centrality. The skier assumes a position with the trunk slightly curved (kyphotic), the arms advanced and distanced from the trunk. The outriggers are wide forward and the pads must brake to decrease speed.
- **CENTRALITY:** This is the condition that occurs when the resultant of the forces considered to be applied to the skier's center of gravity falls within the perimeter of the uniski base.
- **CENTER OF GRAVITY(CENTER OF MASS):** The center of gravity is the point at which the resultant of the weight force relative to the different parts of the body is assumed to be applied. The center of gravity is located in the central area of the pelvis, at the level of the navel. All forces acting on the skier are applied to the center of gravity or center of mass.
- **CENTRALITY:** It is the condition that occurs when the resultant of the forces considered to be applied to the skier's center of gravity falls within the perimeter of the support base of the uniski.
- **CURVE CLOSING POINT:** The geometric curve closing point is the point, that coincide with the change of edges, at which the ski has finished completing the previous curve and must start the next curve
- **EDGE GRIP:** It is the angle of incidence formed by the transverse axis of the ski with the slope.
- **INSIDE-OUTSIDE / DOWNHILL-UPHILL / RIGHT-LEFT:** These terms specify the location of the different parts of the body and the skier's materials on the snow.
If the skier is on a diagonal with respect to the slope, the “downhill-uphill” terminology is used by convention, if he/she is on the maximum slope or level, “right-left” is used and when traveling along a curvilinear trajectory “ internal-external. ”
By varying the edge grip, the skier changes the direction of the trajectory.
- **MODULATION OF FORCE:** Ability to measure the muscles's contraction to control the forces and the inertias that act on the skier.
- **ORIENTATION OF BODY SEGMENTS:** The body's segments can rotate in the direction of the curve in a different ways (before or after, more or less) with different angular velocities: depending on the skier's technical level and the trajectories of the curve that need to be executed. The rotation of the various body segments, performed with different direction and timing, determines the realization of the curve trajectory
- **ROTARY ACTION:** rotation of the bottom of the mono-ski so as to allow the ski to change direction.

5.2 LESSON PLANNING - METHODOLOGY AND EXERCISES

5.2.1 FLAT SURFACE DRILLS

Work on the flat surface is essential for good basic skills. Flat surface drills develop the necessary balance, ski control and rotational skills needed for the curves.

Falls drill: Hands in the lap, pull the head (chin) to the trunk. If the mono skier (client) is afraid to fall, we simulate the fall by slow lying on the snow or just as a signal.

Getting up drill:

With assistance: it is needed to turn the mono skier to the horizontal position corresponding with the slope. The skier folds down the stabilizers, the assistant comes from the side and steps on the ski. The skier gives a closer stabilizer to the instructor, who slowly pulls the mono skier up holding the stabiliser. Mono skier can help to get up by pressing and pushing the other stabiliser. It is not recommended to lift the Monoski by handlebar, because the effect of a power which is not in the same axis as ski binding usually causes a rotation of the structure towards the ski and the safety binding turns off.

Without assistance: only experienced skiers mainly with lighter physical disabilities (paraplegia, amputation) are able to get up this way. The skier must turn the skis in the right direction and fold the stabilizers. The skier rises on the lower arm and he/she will use the stabiliser in the other upper (f.e. right) hand to push the body against the snow/slope. In certain distance from the snow, if the pushing is strong enough to catch the other stabiliser by (f.e. left) hand, the lower (f.e. left) hand catches the stabilizer and completes the movement to required position by the support of the lower stabilizer. Self-standing practise is ideal to realise on a steep slope.

Warming up: It is good for skier to learn how to warm up before each riding or practise. If we organise a warming up for beginners, it is better to do it with an assistant and his/her possible help.

Drills:

- Simulated falls and getting up (safety!)
- Balance with stabilizers on the place-bending forwards, backwards, sideways
- Lifting up on folded stabilizers-stabilisers next to the body, lightening the center of the ski
- Star turnover: With folded stabilizers next to the body, the center stays in the same place, rotation around the heel, rotation around the tip toes
- Forward and backward shifts with folded stabilizers
- Forward and backward shifts with open stabilizers (using the inner side of the stabilisers' skis)
- Forward movement
- Backwards movement
- Pulling the rope in the basic position - one assistant pulls the rope, the second ensures skier safety by holding the shell

Warming up is also important for skiers with more severe disabilities. The help of the instructor is necessary due to the less self-sufficiency of the skier, for his/her better safety and also for checking the correct performance of the exercises.

Drills:

- Head-to-sides (possible fixation of the shoulders by the instructor), diagonal bending, twist the head without significant inclination of the head, turning of the head
- Twisting of the shoulders on both sides (with arms in the grip), twisting of the whole arm, twisting the arms in against movements, etc.
- Single-sided raise of the arm followed by putting arm to the back to its maximum (with focus on gentle and safe reaching the maximum range by the instructor)
- Single-sided raise of the arm to its maximum together with trunk rotation
- Single-sided raise of the arm followed by side bending of the trunk (instructor can fix the pelvis on the stretched side)
- Max. bending with stretching of upper limbs (instructor can push a little bit to get further)
- Upper limbs in abduction – rotation of the arms (against movements) with simultaneous rotation of the head (spinal exercises)
- Trunk rotation – upper limbs flexed on the chest

5.2.2 DOWNHILL SKIING

We perform the practise on the slope on not steep hill, preferably in a slight counter slope or on a slope which ends with a flat surface. For the beginning, it is better to be prepared to help all the time. Instructor considers whether it is possible to leave the skiers by himself/herself when driving after some time of practise. It is also possible to use a rope placed on mono skier abdominal belt which hold him/her and gives a possibility of free movement. If the rope is short, the instructor can also prevent the falls and control the speed. If there is too many falls, the beginner skier could be disgust.

Skiing in the basic position: We start skiing in the basic position by rotating the ski tip downhill. Body relaxed, stabilizers slightly forward, trunk slightly forward, the skier is looking in front of him/her. Braking with stabilizers: when skiing from a soft, not steep hill, we can use back edges of stabilisers to stop by pushing them or putting them to position "Plow."

Slowing down by stabilizers: the same principle as how to brake.

Drills:

- Driving/skiing to stop
- Driving/skiing with slowing down and re-accelerating
- Driving/skiing to stopping by braking
- Driving/skiing to stop and new initiation of drive/skiing
- Moving the stabilizers forward and backward
- Lifting one at first and then the other stabilizer (we need to transfer the balance to the other side)
- Lifting of both stabilizers (only if the skier is sure)

5.2.3 DIAGONAL SKIING ON THE SLOPE

To ride diagonally at the slope, we choose a more soft terrain. We request the basic position from the skier and describe the position for diagonal riding/skiing on the slope. The ski is on its edge, stabilizers help to hold the balance, and they are placed in direction of skiing and are slightly in front of the body. The weight of the body is easily transferred towards the slope, the trunk goes slightly downhill. The skier looks in the direction he/she goes.

Curves practise

The best way how to practise the curves is with assistance. The assistant/instructor helps at a certain moment with an inclination to the curve and this way he/she allows the skiers to feel the correct movement. The curve can be divided into three phases: curve setting, curve management and curve termination. Sources show different phases, and sometimes these 3 phases are accompanied by one more -transient or among curves phase.

Curve drills:

- Curve to slope to stop
- Downhill curve
- Curve over the slope diagonal

Connected curves

Before practicing curves, instructor explains the correct technique to the skiers. Basic posture -opening the door (stretching the arm, putting the stabilizer slightly in front of the ski to the side, turn of the wrist) - tilt (transfer of the weight to the side) – bend (transfer of the weight to the front part of the ski) - return to the basic posture. Let's remind the skier not to be too stiff and be more relaxed. It often happens that the elbows are close to the shell. That is why we use expression -"to carry melons" (elbows farther and higher from the shell).

Curve to slope to stop (braking by curving) We initiate this curve by driving diagonally through the slope. Diagonal skiing through the slope - transfer the balance to the top edge of the ski - a slight tilt-opening the door - to the stop - straightening to the basic posture.

Drills:

- Several curves to stop – for the one and then the other side
- Overwork of stabilizers (the skier finds out what the skis do in different positions of the stabilizers)
- Excessive and accelerated transfer of the balance

Downhill curve

This stage tends to be difficult for skiers. The skier stands in the direction from the hill (facing downhill). The ski goes on the skid and the skier must get it to its edge. Basic posture (downhill) – start - transfer of the balance - opening the door – tilt – till the stop.

Drills:

- Downhill ride with the help of a rope (assistant/instructor corrects the speed of the ride)

- Downhill ride by using a rope with a slight hint of an curve, return to the base posture (both sides)
- Several curves to stop on both sides

Downhill curve over the fall line

The skier starts driving diagonally on the slope in the basic posture. To start the curve mono skier has to forward the lower stabilizer, the skier looks from the hill and the skis are spinning towards the fall line. The weight is then transferred to the inside edge of the ski, the door is opened (stabilizer ejection), the tilt and the curve spinning to its final phase

Drills:

- Spin to the fall line and back
- Shorter and longer curve

Connected curves

We can begin with the connected curves if the skier controls well the curves downhill over the fall line on both sides. The best is to practise on a slope that the skier knows well. It is important to pay attention to return to the basic posture and to work well with the trunk in between the curves.

Drills:

- Slalom
- Curves sizes
- Change of terrain

The next step is carving curves. In carving curves the skier does not get on the skid, but he/she goes on the edges. This skiing style is accessible only for advanced skiers who can handle the sliding curves without problem. It is good to go with the skier, hold the back of his/her monoski and help him/her with a tilt and move to the next curve at the beginning.

5.2.4 SKIING WITH A PERSON WITH SERIOUS DISABILITY

There are skiers with serious disabilities who will not manage anything from above mentioned methodology.

Not even a try of semi-independent ride is possible for them. However, even those persons do not have to be refused from skiing and they can ski.

If the skier has at least partially retained the trunk muscles, he/she can help the instructor by trunk tilt in the direction of skiing and this way he/she supports performance of curves. In this case, the skier and the instructor must communicate in a good way - the instructor gives the command to which the skier responds by tilting his/her trunk.

We have got a good experience with a command "and hop!" Short, clear and concise.

According to the position on the slope, the skier can turn to the right side - from the edge of the slope to its center.

On the contrary, we do not have good experience with the commands "left!" or "right!" Some skiers are able to confuse the sides and, in good faith, try to turn to the opposite side than it is needed.

The instructor has got more work then as he/she needs to keep the right direction.

At the end we will speak about the skier, who is not able to work with his muscles at all, who cannot actively participate in the teaching, because his medical condition does not allow it. All activity remains on the instructor; the skier is passive, "as baby in a pram".

On one hand, it is more physically demanding for the instructor; on the other hand it avoids situations where the skier performs some unexpected movement, which the instructor must correct.

It is of course important to communicate with the client continuously, to make sure that everything is in ok and to assure his/her thermal comfort, comfortable seating, possible problems, differences in equipment setting, suitable driving style, etc.

The instructor has to listen to the client's problems and requests and modify what he/she needs to change.

Although the skier is passive and does not interfere the ride, his emotional experience can be the same, if not bigger than experience of an active skier. And especially in this case it is the point why we do it for - positive emotional experience and driving pleasure.

5.3 SKI LEVEL

5.3.1 BEGINNER LEVEL

BEGINNER LEVEL: BASIC

Purpose: to get a descent in total safety by controlling the speed through a sequence of direction changes.

Ground: Slightly sloping ground with flat start and end.

Skills to be developed:

- keep the balance (descent on the fall line pressing on the outriggers).
- Speed control (descent on the fall increasing or decreasing the pressure on the outriggers).
- Change of direction (from crossing to uphill or from crossing to fall line).

BEGINNER LEVEL: ADVANCED

Purpose: carry out a series of direction changes using the pressure on the outriggers.

Ground: slight slope.

Skills to be developed:

- Angulation (Changes of direction from crossing to fall line, from fall line to crossing).
- Connect direction changes.

5.3.2 MEDIUM LEVEL

MEDIUM LEVEL: BASIC

Purpose: understand how to make different changes of direction with continuous action by controlling the speed and progressively managing the pressure of the outriggers.

Ground: slight or medium slope.

Skills to be developed:

- Pressure on the outriggers (when crossing, put more pressure on the uphill outrigger.
- Control the edge (alternate crossing and sliding).
- Ski guide action base curve (from the descent on the fall line, to the traversing).
- Management of the trunk in the curve phase.

MEDIUM LEVEL: ADVANCED

Purpose: understand how to realize different curves creating a progressive reduction of the sliding, with a more precise driving action with different times and rhythms.

Ground: medium slope, even steep (red slopes).

Skills to be developed:

- Active Edge
- Directing the ski (Kristiania turn from the traversing to the downhill always on the edge).
- Adaptation to different curve arcs (sequences of medium, large, short).

5.3.3 ADVANCED LEVEL

ADVANCED LEVEL: BASIC

Purpose: understand how to make different curves in conduction(on the edge), with different arcs and on any type of slope.

Ground: it can change from medium or easy to more difficult; taking into account the arc of curve, optimal advancement speed, technical skills and psycho-physical condition of the skier.

Skills to be developed:

- Maintain the central position.
- Increased coordination in the use of outriggers (outrigger's shoe parallel to the snow).
- Adaptation to different curve arcs (several curves made in the short-large-medium arc).

ADVANCED LEVEL: TOP

Purpose: understand how to make competitive curve sequences with good speed, with different curve arcs that can create the basis for the competitive level.

Ground: it can change from medium-easy to very steep on any type of snow. Tracks: red-black.

Skills to be developed:

- Improvement of the motor gesture (competitive basic turn from diagonal to downhill)
- Maintenance of the centrality in speed condition (outrigger's shoe parallel to the snow).
- Adaptation to different turn arcs (different competitive turns with short-large-medium bows.)



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FEEDBACK FROM TEACHERS AND COACH

These guidelines have been read and appreciated by the various instructors who have shared our work.

From this season they will be tested on the field and a report will be released which will be included in the links&reference (www.skiforall.eu)



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KEY CONCLUSIONS OF GUIDELINES

CONCLUSION

After two years of collaboration and work among six different European organisations from four countries, the SkiforAll has accomplished its first step. Therefore, we are happy to present the final outcome 'Guidelines for Training teachers and Coaches in Ski Activities for Persons with Disabilities', ready to be disseminated among European Network and our associative work.

Different ski coaches experienced in monoski/dualski have come together with non-governmental organisations for people with spina bifida and hydrocephalus to spread the word about new techniques for ski and people with disabilities. The project is based on the idea of full inclusion of people with and without disabilities into sport.

As mentioned in the intro of this document, the article 30 of the UN Convention on the Rights of Persons with Disabilities (UN CRPD)¹ establishes that countries that have ratified the CRPD should actively promote the participation of persons with disabilities in sports and physical activities. The guidelines of the Skiforall project are a very useful tool to achieve a real implementation of the CRPD.

Some of the good practices achieved along this project are:

1. Ski coaches with disabilities implement learning classes to ski coaches without disabilities
2. Collaboration and co-production of joint methodology between different European partners
3. Organisation of camps for people with and without disabilities, coming together to practice sport including ski in schools
4. Feedback from coaches considering their long experience practicing ski, including dual and monoski.
5. Gathering of testimonies from ski/monoski coaches and young participants of the trainings

Through these guidelines, the SkiforAll project and its partners introduce a new perspective of sport based on a full inclusive programme at European level.

According to this, the European Union should continue financing inclusive projects such as SkiforAll in order to comply with the rights of people with disabilities included in the CRPD. In this way, we would continue promoting inclusive sport programmes in schools, teaching children of different European countries about the importance of inclusion.

¹ <https://www.ohchr.org/EN/HRBodies/CRPD/Pages/ConventionRightsPersonsWithDisabilities.aspx>



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REFERENCES AND LINKS

References and links will be inserted in the website to be always updated and current
www.skiforall.eu

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GUIDELINES FOR TRAINING TEACHERS AND
COACHES IN SKI ACTIVITIES FOR PERSON WITH
DISABILITIES

<https://www.skiforall.eu/>