Guidelines

"Autism and Sport " (IO n. 2)

Autism and Sport
Train Social Inclusion

isdir
federazione italiana sport paralimpici degli intellettivo relazionali

Co-funded by the
Erasmus+ Programme
of the European Union

2021

0 AUTHORS

Autism and Sport Guidelines

This book has been produced as result of the Autism and Sport: Train Social Inclusion (AU.SPO) Project. A partnership co-financed by Erasmus+ Sport Programme in the European Union, Grant Agreement Nr.612993-EPP-1-2019-1-IT-SPO-SCP (start date: 01-01-2020 end date: 31-12-2021)

Project coordinator: A.S.D. RUNNING MATERA (ITALY)

Project partners:

1) FEDERAZIONE ITALIANA SPORT PARALIMPICI DEGLI INTELLETTIVO RELAZIONALI (ITALY)
2) FONDAZIONE STELLA MARIS MEDITERRANEO ONLUS (ITALY)
3) AIAS MELFI-MATERA ONLUS - ASSOCIAZIONE ITALIANA ASSISTENZA AGLI SPASTICI (ITALY)
4) UDRUGA ZA SKRB AUTISTICNIH OSOBA (CROATIA)
5) ASOCIACION DE PADRES DE PERSONAS CON AUTISMO DE BURGOS (SPAIN)
6) AUTISM BAIA MARE (ROMANIA)
7) NODIBINAJUMS SPRING (LATVIA)

Website: https://elearning.hsh.it/autismandsport/

Email: autismandsport.erasmus@gmail.com

Facebook page: “Autism and Sport: Train Social Inclusion”

Index of Contents

1 EXECUTIVE SUMMARY

The aim of the project is to start a sustainable and continuous learning path that connects social workers, sports coaches of sports clubs, residential structures, associations, NGOs, Foundations and in a greater involvement in sport and educational activities.

The specific objectives are strengthening the use of sport as a tool for social inclusion and bring awareness of the potential of Sport in the rehabilitation treatment of ASDs. The e-learning course will provide a training to social and health workers and sports volunteers, while the technical manual will act as an incentive to promote sports activities for people with ASD.

collaboration between the Italian partners of 'Autism and Sport: train social inclusion' project. The document contains best practices and technical guidelines addressed to social workers, teachers, trainers, volunteers, coaches, managers, and staff of sports organizations who are willing to improve wealth and social inclusion of young people with autism spectrum disorder (ASD) through sports.

Under the supervision of the project coordinator Running Matera, Fisdir oversaw the drafting the course program and the technical manual in cooperation with Fondazione Stella Maris who gave its contribution in terms of analysis and materials related to clinical aspects of autism spectrum disorder, and AIAS Matera, who provided materials related to their direct experience in the field improving participation in sport activities of children with ASD

"Autism and Sport: Train Social inclusion (AU.SPO.) is a project of "Collaborative Partnerships" which has the main objective of encouraging social inclusion and equal opportunities in sports, through greater participation in the sports activities of adolescents and young people with autism spectrum disorder (ASD).

The project involves 8 partners from 5 European countries: Italy, Romania, Spain, Croatia, and Latvia.

2 AUTISM & SPORT: Train social inclusion – Project Partners

2.1 FISDIR

FISDIR the Federation to which the Italian Paralympic Committee has delegated the Paralympic activity of intellectual and relational disability which can be identified with the acronym FISDIR.

The Italian Paralympic Committee was formally recognized as a public body in February 2017 and is called to regulate and manage sporting activities for the disabled throughout the country, with criteria aimed at ensuring the right to participate in sporting activity in conditions of equality and equal opportunities.

Today the Italian Paralympic Committee can be assimilated very well to CONI, as it is a federation of Paralympic federations that deal with athletes with disability. It has an umbrella function that includes 19 Paralympic national sports federations, 9 Paralympic sports federations, 8 Paralympic associated disciplines, 13 promotional bodies and 7 worthy associations. So, it is the body to which the state has delegated all sporting activity for the disabled in our country.

We can broadly identify three Paralympic sectors:

1. Physical disability
2. Sensory disability and
3. Intellectual disability

Intellectual disability is the largest segment of the Paralympic world, and FISDIR mission is to normalize sport practices among people with intellectual disability, because we believe that sport improves the quality of life and can enhance individual abilities. FISDIR aims to promote the complete autonomy of the athlete, a prerequisite for a real acceptance in the sports world of the so-called able-bodied.

It is very important to define some conceptual categories, especially with regards to the activity that is carried out by the intellectual disability.

FISDIR is a multidisciplinary federation that manages 18 sports disciplines that are divided into two sectors: promotional and competitive. All FISDIR competitions are normally held between athletes with intellectual disabilities.

FISDIR is responsible for organizing the Italian championships, regional championships, and many other activities. The main disciplines are athletics, bowls, football, rowing, horse riding, gymnastics, hockey, judo, swimming, lifesaving swimming, synchronized swimming, basketball, volleyball, Alpine skiing and Nordic skiing, taekwondo, tennis, and table tennis.

FISDIR adheres to two international organizations dedicated to intellectual disability: INAS (International Federation for Athletes with Intellectual Impairments) and SUDS (Sports Union of Down Syndrome).

INAS is a member of the International Paralympic Committee, the international body that presides over the Paralympics and as such its competitions are in effect Paralympic.

SUDS is dedicated to athletes with down syndrome and is the umbrella organization that oversees sports practised exclusively by people with down syndrome, through seven international discipline federations.

FISDIR, for its mission and its activity, has important numbers: 326 clubs, 8242 members, 1386 down athletes, 1207 athletes with mild mental retardation, 2029 athletes with medium mental retardation and 858 athletes with severe mental retardation, all assisted by 1352 managers, 1000 technicians, over 400 volunteers.

2.2 FONDAZIONE STELLA MARIS MEDITERRANEO

The Fondazione Stella Maris Mediterraneo is non-profit organisation and pursues only solidarity objectives in the field of health and scientific research.

The Foundation's staff includes: psychologists, educators, child neuropsychiatrists, therapists and researchers all under the supervision of scientific director Prof. Filippo Muratori, one of the leading experts in the field of neurodevelopmental disorders.

The Foundation's activity is specifically aimed at developing a Centre of Excellence for diagnosis and care of Developmental Disorders in the Basilicata (Italy), divided into several structures that act synergistically and have regional and extra-regional value, identifying more flexible forms of management. Following this project since the end of 2016 the Foundation carries out a managerial experimentation of the network of child and adolescent neuropsychiatry of the Basilicata Region, integrating his activities with those of the neuropsychiatry unit of the Madonna delle Grazie (Azienda Sanitaria Matera) Hospital in Matera. It also aims to strengthen and activate services that are particularly lacking in the southern regions in particular: a service of hospitalization of adolescents with acute diseases of child neuropsychiatry competence, a semi-residential and residential service for individuals with autism spectrum disorders in childhood.

2.3 AIAS MELFI-MATERA Onlus

The objective of AIAS Melfi- Matera Onlus is to provide mental and physical rehabilitation services to its patients as well as psychological support to them and their families.

AIAS Melfi Onlus is located in the Basilicata region and is part of the "AIAS Nationale": a countrywide network of similar associations. In all the different branches in Italy, the No-Profit organizations were created with the collective effort of families in need of solution for their disabled children. Since 1969 in Melfi and since 1994 in Matera, we actively encourage and support our patients in all kind of sport activities since we firmly believe this enhances their wellbeing, support their rehabilitation results by improving their behavioural, interpersonal and social skill.

With two local ASD (Amateur Sport Association) "Il Gabbiano-Melfi" and "Pegaso AIAS Matera", we promote activities in the following sport disciplines:

- Horse Riding
- Athletics
- Tennis Table;
- Swimming;

However, we are actively looking for partnerships with other sport organizations to include our autistic athletes in other sport activities different from the mentioned ones.

We have participated and also organized events at Municipal, Provincial Regional and even National level.

We have organized sport related open days, with the aim of getting our disabled "youths" closer to the different disciplines, always considering both the theoretical and practical moments.

2.4 RUNNING MATERA

The sports association was founded in 2012 and is affiliated with the Italian Paralympic Sports Federation of Relational Intellectuals (FISDIR), the Italian Football Federation (FIGC) – Paralympic and Experimental Soccer Division, and the National Educational Sports Center (CSEN); it is also registered in the CONI National Register of Amateur Sports Associations.

The Company regularly participates in all sports activities: championships, events and tournaments. It also has a technical and medical staff.

The Association, in addition to amateur sports activities, pursues the following non-profit social purposes, for collective interests through social promotion activities aimed at members or third parties.

In particular, the sectors involved are: environmental-tourism, cultural-educational, ethical and spiritual, social, civil, sporting-recreational, protection of rights and other purposes of social promotion.

These activities are aimed at:

1. the implementation of the principles of peace, pluralism of cultures and solidarity between peoples;
2. to the development of the human personality in all its expressions and to the removal of obstacles that prevent the implementation of the principles of freedom, equality, equal social dignity and equal opportunities, promoting exercise of the right to health, social protection, education, culture, training as well as the enhancement of aptitudes and professional skills;
3. to the protection and enhancement of the historical, artistic, environmental and natural heritage as well as local traditions;
4. to cultural, ethical and spiritual research and promotion;
5. to the dissemination of sporting practice aimed at improving lifestyles, physical condition and psychic as well as social relations;
6. the development of social tourism and the tourist promotion of local interest;
7. the protection of the rights of consumers and users;

8. the achievement of other purposes of social promotion.

The purpose of profit is absolutely excluded, even in deferred forms or indirect, with the prohibition to divide the profits among the shareholders and with the consequent obligation to reinvest any management surplus in the institutional activities provided for by the articles of association and to devolve the residual assets, in the event of dissolution, for purposes of social utility.

Implementation of the following AUTISM AND SPORT projects: TRAIN SOCIAL INCLUSION (AU.SPO.) and SPORT ACTIVITIES FOR PEOPLE WITH DOWN'S SYNDROME (SPADS), funded by the European Commission under the ERASMUS + SPORT Call.

For information and registration: runningmatera@gmail.com

Web site: www.asdrunningmatera.it

Facebook page: "Running Matera"

2.5 ASSOCIATION FOR THE CARE OF AUTISTIC PERSONS RIJEKA

The mission of the association is to bring together parents and relatives of people with autism spectrum disorder (ASD), professionals and anyone willing to participate to help improve the condition and quality of life for families, children, and adults with ASD.

The association main activities are:

- improving standards and developing care for people with ASD
- cooperation with the goverment, city administration, county administration, hospital employees, etc.
- cooperation with CENTER FOR AUTISM RIJEKA
- informing parents about the rights of children and parents arising from the law on social and pension care
- early intervention: informing and encouraging parents to include the child in an appropriate educational rehabilitation program.

2.6 SPRING JURMALA

NGO's "Spring" previous activities have all been aimed to promote diversity, equality, and inclusion in society for everyone. "Spring" has held local projects in Jurmala city for people with or without various disabilities - the White Cane Day, International day for people with disabilities, Days of Autism, etc. to promote the concept of non-formal education, diversity in society and celebration of inclusion. Also, we are coordinators and partners for various international projects which are concentrated on autism, behavioural problems and many more.

"Spring" organizations main goals are stated as following:

- to promote development of socially responsible citizens society;
- to promote social inclusion process in society;
- to promote and strengthen the development of diverse personalities, personal and professional development;
- to strengthen social dialogue between individuals and various social and professional groups in society in order to achieve common goals.

Inclusive education has a very important part in whole context of national education system, and school where we host our activities is one of the pioneers in the field of inclusive education. This status gives an opportunity to share this experience with other local schools and schools abroad.

The school where Spring hosts all activities is located 200m from Baltic Sea in a great outdoors environment which gives a lot of space for outdoor sport activities

2.7 ASOCIACION AUTISMO BURGOS

Autism Burgos is a parental Association and non-profit organization that was constituted in 1.984 in order to promote the well-being and the quality of life of persons with autism and their families, providing services to 328 individuals with autism and their families.

The Association also develops a permanent collaboration with institutions public and private of the educational, social and sanitary fields, supports narrow contacts with other Associations, emphasizes professional development and training in the area of the disability and autism.

Services provided, ages & number of users

- Assessments of special and specific needs of people with ASD
- School services: from 6 to 19 (46 students)
- High Functioning Autism Program for youngs and adults (146 users)
- Support to families
- Day Centre for Adults; from 20 to 50 (38 clients)
- Leisure time program
- Residential Service to improve independent life and family support (43 users)
- Training & research on IT
- Design and Development of special software
- Diagnostic Service
- Early attention service, from 3 to 6 (27 children)
- 3 Branches in the province of Burgos: from 6 to 25 (73 users)
- BB MIRADAS: intervention with babies from 0 to 3 (12 babies)

The Association bases all his programs of attention and actions on the lines of scientific evidence and the most innovative and accredited models on this field. Autism Burgos personnel promote the development of individual skills and talents and participation in the community. Given the serious difficulties that people affected by autism spectrum disorder have, it is necessary to provide them with necessary tools that help them to succeed in all areas of life like education, leisure, work, independent life...). We try to give lifelong answers, adapting this approach to all the stages of his vital cycle and to the great variability of the disorder, as well as applied education promoting generalization in inclusive environments.

2.8 ASOCIATIA AUTISM BAIA MARE

Autism Baia Mare Association is the only non-governmental organization founded by parents in Maramureș County, Romania, specialized in recovering children and young people with developmental disorders, especially autism spectrum disorder. The association offers since 2008 hope and empathy to families of young people with autism spectrum disorder. The team of 15 specialists: psychologists, pedagogues, speech therapists, physiotherapists, social workers provide social services in the Day Care and Recovery Center for 100 children and young people from Maramures County and neighboring counties.

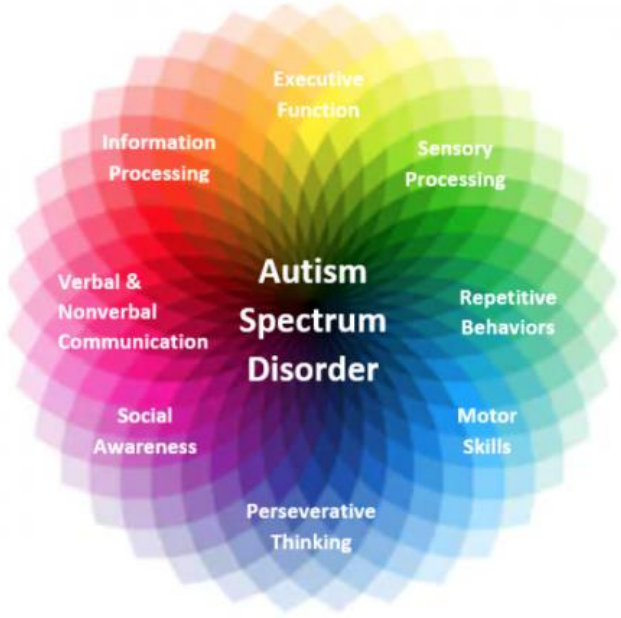
3 AUTISM SPECTRUM DISORDER

3.1 A CLINICAL OVERVIEW

Autism is a condition which concerns many people so much that the European delivered a set of statements that must be considered by those who deal with people affected by autism spectrum disorder (ASD). It is a complex developmental condition involving persistent challenges with social communication, restricted interests, and repetitive behaviour. While autism is considered a lifelong disorder, the degree of impairment in functioning varies between individuals. Therefore, early diagnosis and preventive treatment have a fundamental role to get a precise diagnosis and functioning. In some cases, the functional impairment related to autism may be not apparent until the child starts school, where their deficits may be noticed by their teachers and peers. Therefore, autism spectrum disorder could be identified by noticing deficits in social communications like low interest to approach others, difficulty in making friendships or maintaining eye-contact. When it comes to repetitive behaviour people with autism can be overly focused on niche subjects to the exclusion of others, having difficulty tolerating changes in routine and new experiences, having sensory hypersensitivity (like aversion to loud noises or a certain colour) or most commonly stereotypical movements such as hand flapping, rocking, spinning ecc.

Diagnosis of autism or any other developmental disability, is based upon the *Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition* (DSM-IV), published by the American Psychiatric Association (Washington, DC, 1994).

DSM-IV (fourth) identifies people with ASD as characterized by an atypical social interaction. Alongside atypical social interaction, there are also communication difficulties which can manifest as a delay in speech or difficulty initiating a conversation. It takes in consideration also aspects of external reality, like routine rigidity and stereotyped behaviours, focus on specific part of an object rather than to the whole.



Autism is essentially characterized by two equally important clinical areas, and both must be present in each single individual. The first is the socio-communicative which is characterized by three separate areas: **reciprocity**, **non-verbal communication**, and **development and maintaining relationships**.

According to DSM-V (fifth) each area is described within a spectrum of a different degree of involvement as reciprocity can range from a simple diversity in the development of dialogic conversation up to a reduction of interests and emotions or even absence or lack of initiative in social interactions. So, it goes from more serious levels to a lack of interaction with others that is essentially absence of verbal communication.

A fundamental change introduced by the DSM-V is the definition of the level of severity intended not as autism per se but as a level of severity that depends on two elements:

1. the degree of deficit in initiative in social interaction and communication,
2. the resistance to change repetitive behavior and narrow interests, i.e., the degree of flexibility the child can show with respect to different environmental demands. Thus, initiative deficit and resistance to change are the two elements around which the DSM-V identifies three levels of severity that improve the clinical diagnosis.

Level	Social Communication	Restricted, repetitive, and stereotyped
Level 3: Requiring very substantial support	✓ Severe deficit in verbal and nonverbal communication; ✓ Severe impairment in functioning; ✓ Limited social overtures; ✓ Minimal response to social overtures	○ **Inflexibility** of behaviours ○ Extreme difficulty coping with change ○ Great distress changing focus or activity
Level 2: Requiring substantial support	✓ Marked deficit in verbal and nonverbal communication ✓ Social Impairment apparent even with support. ✓ Limited **social initiation** or/and response to overtures	○ **Behaviour Inflexibility** ○ difficulty coping with change ○ Distress or difficulty changing focus or activity ○ **Repetitive behaviours** appear frequently
Level 1: Requiring support	✓ Deficit in social communication without support. ✓ Difficulty **initiating interactions**; ✓ Atypical or unsuccessful responses ✓ Apparently reduced interest in social	○ **Behavior Inflexibility** causes interference with functioning. ○ Difficulty switching between activities ○ Problems of organizing and planning independent activities

Table 1 – *level of autism severity based on degree of deficit in social communication and interaction and resistance to change stereotyped behaviors*

The DSM-V does not consider language among the diagnostic criteria: autism is not primarily a disorder of language (but rather of communication) but this does not mean that language is often affected by the autistic disorder. Language is therefore introduced by the DSM5 as a specifier, and this means that when we are dealing with a person with autism, and we have well identified what are the nuclear characteristics of the disorder we must then know language as a specifier of one of the most important human functions. Other specifiers are the intellectual level, the internalized and externalized psychiatric comorbidity.

Therefore, by autism we refer to a socio-communicative disorder associated with peculiar cognitive and behavioral ways of relating to external world (identified by the second domain) but once these primary aspects of autism have been defined, we must go on to define what the DSM5 calls the specifiers. This is another element in support of the fact that when we talk about autism, we are not talking about a single clinical form but about many children, so that in the field of autism it is necessary to individualize interventions: there is no single treatment, no single type of intervention but there are many types of intervention that must in turn be specifically planned for each child.

3.2 MOTOR DEVELOPMENT AND EARLY DIAGNOSIS

Autism spectrum disorder goes through several critical periods during the first three years of life. After the second year it is possible to determine conclusive diagnosis, which does not mean that the disorder becomes stable, but only those clinical features are sufficiently clear. Before that age, the behavioral, cognitive, and socio-communicative problems are still uncertain, and it is therefore necessary to look for subtle clinical indicators of autism.

Such early investigation occurs on the sensorimotor level. It is important to emphasize the importance of movement at the origin of the disorder and therefore the importance of being able to work on it through sporting activities also at a later stage. From a clinical point of view, autism is not conceived as a disorder of the higher cortical systems but a disorder that refers to atypical functioning of the subcortical structures of the human brain; the role of the structures of the encephalic trunk was underlined as one of the most important areas deputed to address the efficient integration of sensory information and motor synchronization. For this reason, autism is identified as a very early developmental disorder in which the presence of the classic symptoms linked to the socio-communicative area are not constant but already present at the beginning of development, sometimes only at the sensorimotor level; most probably started during fetal stage.

Observing children with autism spectrum disorder watching family movies made it possible to highlight three interesting facts:

1. autistic children's early preference for objects over human faces and eyes (non-social attention)
2. the developmental delay interferes with the relationship by modifying the parent-child interaction, which becomes particularly charged with aspects of hyperstimulation by the parents motor development

In particular, the use of specific research protocols has shown that motor deficits are a constant in children with ASD and that most of the time motor problems precede socio-communicative deficits. One of the characteristics highlighted through studies is the presence of hypo-activity in these subjects and the lack of goal-oriented

actions. Hypo-active children usually have a poor repertoire of actions and are described by their parents as very quiet children. Such quietness is often associated with a lack of interest in communicating and establishing relationships with others. In general, during the first year of life. The parent naturally has a great need for this stimulation from the child in order to develop their own educational method and create a parent-child relationship. Another area of interest is early infant movements and in particular those early movements that are called general movements, by means spontaneous patterns of infant mobility that begin in fetal life and then continue during the first eight weeks of extrauterine life.

They are described as:

- **Writhing** movement. From small to moderate amplitude and speed of slow to mod and of elliptical form. Fast and large extensor movements may occasionally break through.
- Around 9th week post-term to 16-20 weeks post-term the form and character of GMs change into **Fidgety** movements circular of small amplitude and moderate speed and variable acceleration in all directions of neck, trunk, and limbs. They are continual in the awake infant except during focused attention. They may be concurrent with other gross movements

The first are elliptical movements, the second are more accelerated movements but have the characteristic of being very elegant and are the basis of intentional movement; they are the basic architecture so that an intentional movement can then fully develop. It has been demonstrated that infants who would later develop ASD already have a poor repertoire from the very first months of life compared to the Writhing phase and therefore have movements that are characterized by greater repetitiveness, rigidity, are not very fluid and do not suspend themselves in the moments in which the child becomes attentive towards external environments, showing what is defined as a poor repertoire fidgety movements show a similar situation because these too are of a poorer quality Thus, both the writhing and fidgety movements are altered and could have a predictive value in early diagnosis of autism.

When another characteristic is analyzed, namely the symmetry of children in the lying and standing positions, it emerges that the symmetrical positions are significantly lower than those of children with typical development. The situation is similar when walking asymmetries are assessed. In fact, in children aged around 12 months with ASD there is already an increase in walking asymmetry. In the scientific literature on

autism, several motor atypia has been described referring to postural instability, unusual postures, walking on one toe, hypotonia.

The most recent studies have also focused on these very precocious motor aspects of autistic children that often refer to the concept of hypoactivity, which can be called scarce variability, such as the scarce motor coordination and poor arm movements that are often synchronous with the children's lallation[1]. Sometimes there could also be a delay of the lallation itself. Another interesting sign of early diagnosis of autism consists in the lack of upper body coordination, like when a child can't move from a lying to a sitting position by hold up their head to initiate the movement. The anticipation movement of the head is what is lacking in most autistic children. All these aspects relating to motor atypia are already present in children with autism at an early stage when the communicative aspects are not yet clear in their deficit.

[1] A developmental stage in infantile speech from around 7–8 months when a child repeat (often incorrectly) sounds they have heard. Source: Wikipedia.

In conclusion, we have seen how children with ASD at an early age already show a poor repertoire of general movements, poor general activity, and poor movement variability, which can sometimes also become a delay in motor development, but which together make children more susceptible to an increase in repetitive movements, especially in the hands and fingers, and this is associated with affective language disorder. Motor and sensorimotor problems and repetitive movements: all this makes it much less easy for the child to interact with his parents and this leads to these early motor aspects and atypical interactions with parents. Remember that this early movement defect could limit learning opportunities because movement is a learning opportunity and limits social interactions, so we can really consider movement disorder as a fundamental aspect of autistic disorder and working on motor aspects through sport activities is essential to improve these extremely early

The development of coordination and motor programming disorders are often described in children, but they can often represent aspects of autism, they may then have secondary effects that are represented by repetitive and stereotyped movements. Thus, this raises the question of whether widespread alterations in motor development may represent a central element of autism, leading us to think that difficulties in maintaining social contact may be a downstream effect of motor disorders like repetitive movements. In a recent study (ref), repetitive movements in children with ASD aged 6 to 12 months were assessed by viewing family videos.

In this study a repetitive movement was described as the repetition of movements at least twice, either bending or rotating, and then the frequency and duration of these repetitive movements and the effector making the movement (usually hands and fingers) were assessed.

The results show that children with ASD showed a statistically significant difference in terms of frequency and duration compared to children with typical development.

The second semester of life is the time in life when a child begins to use the hands in a more programmatic way with respect to the actions the hands can perform on objects. It's the time when the hands become organized and become the child's predominant communicative medium where gestures become the most important aspect of development in this period. In children with ASD the presence of these repetitive movements can limit the development of these communicative aspects, interfering with the development of gestures and then later the development of language.

movement defective aspects as it helps creating connections and genuine relationships for people with ASD.

3.3 MANAGEMENT OF PROBLEM BEHAVIORS IN A SPORTING SETTING

Managing problem behaviours of athletes and individuals with intellectual and relational disabilities who practice sports represents a great challenge for all operators in the sector.

Working on problem behaviour is a long process and constantly exposed to the risk of failure. If there is no sharing among the educational team, the future improvements could be compromised from its initial stages. Giving uneven responses in prevention practices will make the management intervention extremely complex. Problem-behaviours might be defined as follows:

behaviors that endanger physical safety

they are destructive in terms of relationships with others

behaviors that severely limit integration into society

behaviors that hinder learning and development

3.3.1 Behaviour Evaluation

The first step in evaluating a behaviour in a structured way is the collection of information (diagnosis, therapy in progress, personal information). A widely used technique is the **functional assessment** of the situation which allows to identify dysfunctional behaviours, their antecedents, their consequences, and the function they play. Among the various types of functional assessment there is the **descriptive assessment** which involves direct observation of behaviour in naturalistic settings, but without any manipulation of environmental conditions.

The descriptive assessment represents the first step to be taken to then define the appropriate intervention strategies based on what has been observed. It must be said

that in a sports setting, making an accurate descriptive evaluation is very difficult, since the resources to observe the child systematically at any time may be lacking. This type of assessment is appropriate in the case of children with autism spectrum disorder or communication disorders. The descriptive evaluation is based on what is called the **ABC model**:

- **A= antecedent**; Everything that happens **before the behaviour occurs** (the change of activity, the external temperature, ecc.)
- **B= behaviour**; the specific **response** of the child (when he or she escapes from the place where the activities take place, have oppositional or provocative behaviours, or tries to avoid the activities)
- **C= consequence**; what happens **after the behaviour**. Many consequences are learned in a natural way. In example the child learns that if you place your hand on a hot pot you burn, other consequences are learned over time. During the training athletes learn that to carry out an activity they must wait their turn.

The central idea of this model is that most of the behaviours we implement have been learned. And the same goes for problem behaviours. It is therefore assumed that new behaviours can be taught, more appropriate to the situation. And the same goes for problem behaviours.

It is therefore assumed that new behaviours can be taught, more appropriate to the situation.

There are several reasons why an individual with a disability may engage in problem behaviours:

- It allows to escape from a task or situation. For example, he/she can be aggressive towards a partner during an activity that he considers too demanding or frustrating.
- It allows to get attention. For example, he/she bangs his head on the ground when adults ignore him/her.
- It can be used to get what he/she wants. For example, engages in dysfunctional behaviour (yelling) in order to achieve a specific purpose (ice cream).

- It can make him/her feel good. For example, he/she can speak very loudly because he likes the sound of his voice.

Therefore, understanding the function of the problem behaviour can help in choosing the best strategy for intervening on the problem behaviour.

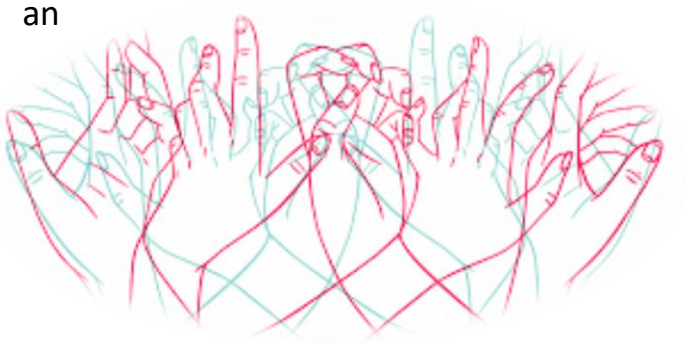
3.3.2 Preventions Strategies

Psychoeducational interventions related to the reduction of problem behaviours can be included within three categories:

A. The interventions on the background and, more generally, on the environmental aspects
B. Interventions to increase skills
C. Interventions on consequences (reactive strategies)

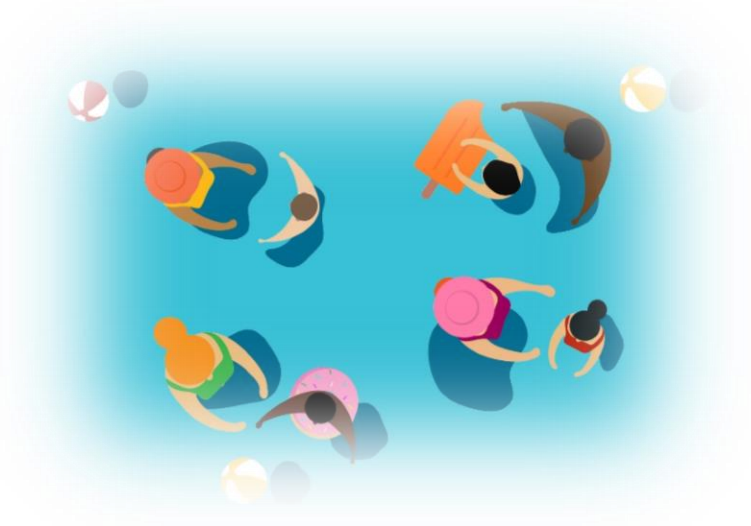
During sports activities, the first step in managing these behaviours is to prevent. Prevention strategies are chosen based on the antecedents of the problem behaviour to be prevented, i.e., by working on part A of the ABC model.

- Establishing clear rules and a detailed program of planned activities: clearly communicating the timing of the game, the routine of the tasks to be performed, allows the student to create an expectation that facilitates him in managing behaviour. A technique that can be used to structure the program of activities is the creation of a board with clear and specific visual references;



- Change the order of activities in case the individual with ASD has difficulty finishing a pleasant activity in view of something you don't particularly like. In example, first the swimming lesson after the soccer one;
- Make small environmental changes, for example, you can provide a snack before lunch to calm hunger or replace the noisy activity with a quieter one;

- Limit the duration of an activity, for example, schedule to spend 20 minutes in the pool rather than an hour and then carry out alternative activities while the group is engaged in swimming;
- Control the environment, that is, do not allow them to stay in places that are unsafe or from which you can easily escape.



When it comes to establishing a set of rules with a pupil with ASD, we are performing the so-called practice of **"reinforcement"**. Reinforcement implementing practices that increases the probability to start behaving in a good way when facing specific situations. The adequate use of this technique allows to modulate the pupil's behaviour, increasing the frequency of positive behaviours and decreasing dysfunctional or unwanted behaviours. For example, teach a form of communication that is an alternative to problem behaviour, that has the same function and obtains the same reinforcement results. The general strategy consists in activating the appropriate behaviour every time the signal occurs.

Sample model → The student engages in problem behaviour every time the attention of the sports operator fails on him. The operator teaches the student, every time the problem behaviour arises, to tap his shoulder to ask for attention: Operator: *"Paolo tap on my shoulder!"* and Paolo taps the operator on the shoulder and the operator turns around saying: "*Yes Paolo, tell me, do you want to show me something?*"

There are different types of reinforcements:

- Primary (food or drink)
- Socio affective (praise, compliments, hugs)
- Tangible (concrete objects)

- Activities or privileges (doing a pleasant activity or enjoying a privilege)

Reinforcement is a practice that must be performed consistently, otherwise the problem-behaviour doesn't disappear, on the contrary it could get worse!

3.3.3 Reinforcement Phases

Phase 1: identification of target problem	Identify the behaviour you want to change
Phase 2: make a reasonable request	The behaviour that the instructor asks of the athlete must fall within the abilities of the subject: if the task is too complicated, it is good to divide it into simpler steps
Phase 3: decide how often the behaviour should be reinforced	If it is a new behaviour, it is best to reinforce it every time the child succeeds in the task
Phase 4: give reinforcement immediately after the behaviour	To make the athlete understand that there is a connection between the behaviour and the reinforcement, it is necessary to give him the reinforcement immediately after he has implemented the desired behaviour. After he has performed the desired behaviour.
Phase 5: behavioural reinforcement	Each time the athlete carries out the desired behaviour, he will obtain a reward and reinforcement gets better
Phase 6: maintain the value of reinforcement	Accept that the athlete has access to reinforcement only after the desired behaviour and not during other times of the day (for example at home).
Phase 7: pair socio-affective reinforcements with tangible rewards like desired activities, tokens, prizes, and compliments	It is important to be specific and let the athlete know exactly what you are rewarding or praising him for. In example, if the athlete autonomously puts his dirty clothes in his backpack, instead of saying "well done" we should say: "Well done. You put the dirty clothes in the front pocket of the backpack by yourself"

3.3.4 When reinforcement is not effective enough

If working with the reinforcement doesn't solve the problem behaviour, it is necessary to activate intervention techniques that act directly on the consequence (part C of the ABC model). First, we need to distinguish mildly problematic behaviours from severe ones.

A criterion that can be used to implement this distinction is the **tolerability of behaviour**. If the individual with disabilities engages in behaviour that is harmful to himself or to others, then it is necessary to intervene with incisive techniques. On the contrary, if it engages in annoying but tolerable behaviour, it can be managed with a technique called extinction. When the pupil with ASD engages in problem behaviour, for example, he/she begins to scream because he believes that by doing so, he obtains the satisfaction of his desires, strategically ignoring his behaviour, for example by avoiding making eye contact, talking to him/her, can be very effective in order to reduce the chances that behaviour could repeat itself.

Sample model → A child bites his hand every time the operator proposes an exercise because he has experienced that, by doing so, the exercise is interrupted.

Sample model → A child bites his hand every time the operator proposes an exercise because he has experienced that, by doing so, the exercise is interrupted. Extinguishing means: asking to perform the exercise even if the student is biting himself.

It is essential to foresee that with extinction there is also an intensification of behaviour that must be tolerated. Faced with a denial, for example, there may be outbursts of anger, screams, etc. Usually, problem behaviours increase in gravity before they disappear. In the presence of serious behaviours that can be harmful to the person or to others, it is necessary to implement incisive interventions.

One of the techniques that can be used is "physical restriction", or motor inhibition of the student. This technique should only be used for the limited amount of time in which the behaviour occurs and should not be accompanied by reproach or blame.

In general, it is good to maintain a 1: 1 ratio between the athlete and the instructor / operator. In any case, it is advisable that as few people as possible intervene.

The presence of other children could create dynamics of social reinforcement, such as imitation. Therefore, the student should be moved away from the rest of the group (or the rest of the group should move away from the child) in a neutral way, to avoid emulation or reinforcement by peers. The choice of the correct intervention strategy is crucial for achieving improved behaviour and must be carried out not only on the basis of the type of behaviour implemented, but also on the temperament of the pupil and his/her individual characteristics.

4 LANGUAGE AND SOCIAL COMMUNICATION

4.1Communication in Sport

Communication is a central aspect of any form of relationship between people. In sport, effective communication is a fundamental aspect influencing people's behaviour and performance, regardless of age and level. When it comes to training activities, the relationship between coaches or sport volunteers and athletes can be more or less effective depending on the way they communicate. Following there are three main characteristics coaches and sport volunteers must rely on, especially with young people and those with mental or physical impairments:

- Professional experience. Field experience is very important to understand how to work and communicate in a specific way to understand and evaluate the performance of their pupils.
- Intuition. It means doing the right thing at the right moment. In all sports there are moments in which coaches must be able to understand which the right moment to intervene, i.e to promote a certain activity or to block it.
- Ability to stimulate and motivate others. To improve the awareness of athletes and pupils, in relation to the results they could potentially achieve (this applies especially to young people with disabilities) it is extremely important to stimulate them and motivate them in a right way that makes the aware of their own individual strengths and limits.

In general, the way we behave continuously influences others. Even silence is a form of communication. It is no coincidence that communication is known to be a circular process.

In sports both verbal and nonverbal communication matters at the same level, as from one side coaches and trainers must explain exercises clearly and in the simplest way possible and on the other side, they must show how to perform them in the right way so that everyone are able to repeat the exercises. The training process follows with observation and understanding weather someone experience any kind of difficulties and decide how to intervene to solve the problem or help overcoming a limit.

The way we allow pupils to express their needs, to correct themselves, to understand what, for example, they should have done differently serves to favour memorization and motivation. So, coaches must provide clear demonstrations but also empathy, so everyone could feel included and never left alone in case of physical or mental hardships related to the execution of exercises or during a physical test. First and most important rule every coach and trainer must keep in mind, is that in any case one should show disappointment for learning difficulties that some pupils may show along their training sessions. Disappointment does everything but help them feeling motivated and stops them from facing difficulties.

Saying '*Giuseppe still doesn't know how to kick the ball like Antonio*' instead of '*Giuseppe cannot kick the ball*' makes a lot of difference.

We need to improve our communication skills continuously, because people are always different and may understand things differently. Therefore, we should always adapt our communication to the level and abilities of the people we face, to their physical and mental status, to age and to their sensitivity. So, this is a work that never ends and so here's how we continue to see this activation of this extremely important circularity. We also must remember that there are generally two ways of communicating: one focused on the content of our topic or one focused on the way we express ourselves and explain things to others.

What we do and how we do it serves to improve our skills, therefore saying the right things is never enough, but you also have to say them in a way that others understand you well.

4.2 Non-Verbal communication and body language

There are many non-verbal communication channels that influence the correctness of the things we are communicating. One of the more significant in sports is **body posture and gesture** - body postures often reflect our interest or the fact we agree with the other, on the contrary it might reflect a sense of distance, discomfort, or boringness. Seeing the coaches standing with their arms crossed for a long time is something quite negative because it doesn't transmit involvement, energy, or interest for the training activities, which could negatively affect athletes' motivation and confidence.

The right body language of coaches and trainers who work with people with disability is fundamental to make them actively participate in sport. These are the most basic aspects, which should be always taken in consideration before approaching a coaching career, as establishing a good connection and being emphatic with the athletes is the first step to ensure a successful training session.

Taking the topic to a practical level, in a training session there should always be an initial welcoming and a final goodbye. This is important because participants need to know when the activity starts and when it ends and that there is an in-between time that can last an hour or less in which the activities are carried out. The aspect of the opening greeting is important because it's a great moment to establish a connection between athletes and coaches, or even between athletes of the same group. Joining hands and saying motivational sentences is a good practice to encourage active participation, interest for the activities and perhaps, promoting new friendships. A very simple example of communication but an extremely effective one as it serves to spread harmony and motivation between the group components.

Another aspect of communication the motivation of the operator as when it comes to students with intellectual impairment, the learning process might be slower than expected. It may happen that some children even seem not to learn, that some have difficulty to perform a specific movement, or that they react aggressively or tend to isolate from others.

These are all barriers that can create moments of hardship during the training session. One thing to always keep in mind is that all trainers must keep their motivation high

and don't give up or even exclude children with those characteristics from certain activities. The best thing is to ensure an individualized corrective intervention. When children are assigned with a task, it is fundamental to show how to perform that task and explain it in an affirmative way, and when needed, repeat it as many times as every single child need to learn it properly.

Even if a specific exercise may appear very simple, when it comes to sever forms of autism it is not, so frequent repetitions and keeping the enthusiasm high when someone make some progresses will help them to improve their motor skills and will keep them motivated to continue practicing sport. At the same time, we also do the movements, we can also help the kids to do the movements initially and therefore we combine all these aspects: the movements, the gestures, the tone of the voice the timbre of the voice the content of what we say in these forms simple.

4.3 Guidelines for communication with people ASD in sporting settings

Research have shown that parents or other caregivers of children with ASD have suffered shame, embarrassment and have felt judged and have been treated negatively from sporting insiders (e.g. other athletes, gym instructor, other sport, education and society). Also, researchers have found that parents or other caregivers sometimes try to conceal the child's stigmatized condition from others, overcorrect their child's symptoms and often withdrew from social situations due to fear of judgement from others. Those situations are like red light which shows that something should be done to break these stigmas and make all sides involved feel confident and free in their choices regarding the involvement in sports activities.

So, there is an important role for sport professionals to find the best possible way how to work with people with ASD and how to communicate with their parents, guardians, or other caregivers.

a) Tell the exact location for the activity, such as in the gym, in the pool, on the mat, on the field, etc.

b) Mention where the equipment is placed (e.g. tennis balls are in the bucket or jump ropes are on the ground, etc.).

c) Explain how to move in general space or in self space, such as with a partner, alone, rotations and directions.

d) Establish the boundaries with cones or other markers.

e) Use pictures with cues because it can be very helpful for students as a visual and verbal aid, such as using photos of teachers, the pool or equipment so they can get a visual aid for "go to pool" or "find classroom teacher".

f) Post the list of activities to the board and erase them after they are completed. 7. Keep your sentences/instructions short, slow, and precise.

g) Sarcasm, humour, metaphors, and abstract statements will generally not be understood because it may be taken literally and can cause confusion and make them feel frustrated and upset.

h) Enunciate clearly and speak slowly without speaking loudly.

i) Quantify only then when it is accurate and precise (e.g., if you say “we are leaving in 5 minutes” a child with ASD will watch the clock and expect to leave precisely in 5 minutes). 11. Try to involve them when they are calm (e.g., if they are agitated, they will not be able to focus on what you are saying or teaching).

j) People with ASD may have better processing and retention of directions when they are engaged in some type of movement (e.g., standing on an unstable surface (squishy mat or floor trampoline) or sit on a therapy ball etc.).

k) Provide as much structure as possible for every activity and task that must be completed within the process.

l) Be predictable (e.g., whenever possible, provide a schedule of events or rotations throughout the practice).

m) Use timers where appropriate and possible.

n) Make certain that the tasks and drills are as specific, clear, consistent, and easily accomplished.

o) Present tasks or skills one at a time to make it easier for person with ASD to process what is expected.

p) Give immediate, specific, and positive feedback.

There are two ways how sport specialists can find out useful information about persons with ASD who participate in sport activities:

1. Have a simple conversation or discussion.
2. Create a common survey for everyone where it’s recommended to include following questions:
    - Does your child communicate with you verbally or nonverbally?
    - What are your child’s interests?
    - What can make your child sad or upset?
    - How do you know when your child is frustrated or upset?
    - Which is the best motivation for your child?
    - How do you redirect your child when he/she is getting frustrated?

- Does your child have any stimming behaviours or tics?
- What is the best way to give your child direction?

As the conclusion of this part of guidelines of the project “Autism and Sport: train social inclusion” experts state that all the information mentioned above should be taken only as a recommendation because it’s important to keep in mind that ASD is very complex, and every person has specific symptoms and different needs. So, everyone who is working with it should take it seriously and find out all information needed to achieve best results possible.

5 AUTISM AND SPORT

5.1 Sport therapy and rehabilitation

Numerous studies on international scientific literature indicate the significant role of the sporting activities in promoting both well-being, and physical and mental health. The outcome of this process is the development of greater social interaction, as well as convenient socio-economic effects together with a further contribution to environmental sustainability. Nowadays, sporting activities are considered as a relevant psychosocial integration tool. Indeed, sport helps and strengthens the growth and evolution of each person: especially, it supports young people improving social and personal motor abilities, as well as increasing their sense/feeling of self-esteem and it also represents an exceptional communication tool to make friendships and improve relational skills. At the same time, the use of sporting activities for therapeutic-rehabilitative purposes is also known as "sport therapy": indeed, sport exercise represents an important integration tool that supports the psychological and social functional recovery of people with disabilities.

In 1944 Ludwig Guttmann introduced - in the paraplegic centre of Stoke Mandeville in England - the physical exercise in the rehabilitation treatment of people with spinal injuries for the first time: it can be considered as the first example of introduction of sports therapy in the rehabilitation and psychomotor and social integration of the disabled. This theory has been successful and obtained great results in the rehabilitation centres for severe physical, mental, and sensory disabilities in the following years.

On the basis of the abovementioned studies and through the experience gained at the AIAS neuro-psycho- motor rehabilitation centres of Melfi and Matera, sports practice can provide a contribution to the neuro-psycho-motor rehabilitation of the disabled, completing and integrating traditional techniques and improving their integration into social and relational life.

This approach represents the ideological and motivational mainstay which is aimed at promoting participation of people with mental and physical impairments in sporting activities: in this way the sporting activity has gained structural and organisational aspects, which are managed by the Italian Paralympic Committee (CIP), with the support of FISDIR, that deals specifically with the organization and the development of all sporting activities for people with intellectual impairments.

As described before, autism spectrum disorder is characterized by severe and generalized impairment in two areas of development: one related to social **interaction and communication skills**, the other one related to **interests and activities**. More broadly, people with autism can manifest very heterogeneous symptomatologic conditions in both qualitative and quantitative terms which can be distinguished in low or high functioning forms. **Low-functioning** subjects are identified as those characterized by intellectual disability or by a low IQ, whereas **high-functioning** subjects do not show signs of intellectual disability and they have an IQ within the norm or higher than it.

5.1.1 High-Functioning Autism

High-functioning individuals with autism exhibit behaviour that is interested in social relations. However, they can be bizarre or demonstrate behaviour that is not very functional to socialization. This happens because the difficulties of understanding the mind of others and the communication rules are still present. Often, they can run into misunderstandings, difficulties in reading body signals, continuous interruption of the interlocutor, repetitive behaviours or interests. People with autism spectrum disorder are very affectionate to their routine, they usually perform sequences of actions in a rigid pattern and show agitation over sudden changes. At times they can seem motorically uncoordinated. From a relational point of view, a series of mild or moderate sensory difficulties can cause problems especially in crowded places or where there are intense lights. For example, difficulty seeing a movie in the cinema or spending an evening in crowded places. Another difficulty is the problems of anxiety and stress. Mood disorders are a common phenomenon in people with high functioning autism spectrum disorder. There is also little mastery of social rules, which concern, for example, the volume of the voice that is too loud or too low, the difficulty of expressing one's mood, ideas, and thoughts clearly. The main difficulty lies in the management of emotions, positive or negative, and in their expression in a manner appropriate to the daily situations experienced, especially if these emotions are sudden and therefore not foreseen. Another difficulty concerns coping with changes. In general, an individual with high functioning autism can safely carry out every task

and verbal request that is made to him. The problem arises when, for example, he has to respond to a verbal request that includes two tasks to be performed. In these cases, he would have difficulty carrying out all the required tasks at the same time and could remain stationary at the first request and therefore have difficulty performing multiple activities at the same time. Executive planning can also cause difficulties. Executive functioning represents all the skills that each individual puts in place to plan their daily life. This function allows for example to remind people to perform certain tasks such as remembering a deadline or an appointment. A person with high functioning autism spectrum disorder may have difficulty planning executive tasks as they do not have a well-structured ability.

5.1.2 Low-Functioning Autism

The term low functioning is used to describe people with verbal communication difficulties and with below average cognitive skills. I will list several shortcomings that affect this situation.

One of the main deficits concerns communication and expressive difficulties. These people usually have poor verbal expression skills, and they happen to use words or phrases in an unconventional way, with an articulation of language that is often mechanical.

From a receptive point of view some individuals do not understand any form of verbal language, some understand only a few words. Those with more developed language skills have difficulty understanding figurative and non-literal language, metaphors and all expressions that involve the interpretation of gestures, facial expressions, and body language.

Individuals with low-functioning autism spectrum disorder tend not to maintain eye contact and rarely exhibit pro-social behaviours. For example, the individual does not respond when asked, is unable to hold a conversation, speaks in a robotic manner, does not seem to understand simple questions, is disinterested in expressing his emotions and understanding those of others, reacts to the approaches of others in a way passive, meaning that their attention is not captured by social stimuli as happens in the person with neurotypical development. Often some behaviours are automated and last until adulthood such as repetitive movements, self-injurious behaviours, routine behaviours or small rituals, attraction to insignificant details, sensitivity to lights, sounds and physical contact. Behaviours are rigid and a strong resistance to change linked to a small number of interests.

5.2 Sport as a tool for social inclusion

The European Union Council defines sport as a source and engine of social inclusion and is recognized as an excellent tool for the integration of minorities and groups at risk of social exclusion. The European Union therefore considers sport a fundamental element to promote psycho-physical well-being and social inclusion. Promote physical activity among people with disabilities, especially those with autism spectrum disorder is fundamental. Children and adolescents with autism spectrum disorder are often sedentary and therefore tend to be less physically active than their peers. This increases risk of obesity and social isolation. Practicing sports is a healthy habit for people of any age group, both for children and adolescents, and for adults. It is obvious that if we want to try to maintain a good sporting habit, it is important that sport is practiced starting from a young age, so that children can create their physical activity routine.

Sport activity has a positive influence on many of the disorders caused by the autism spectrum, so for example progress in repetitive and stereotyped behaviours, which become, over time, less frequent. Sport can represent the most suitable means for the perception of external stimuli. It helps learning to memorize the activities to perform and keep a high level of concentration. Most importantly, it also positively affects social interactions, thanks to the improvement of the emotional state. At first, individuals with ASD must get used to the activity, but over time the improvement of all the aspects mentioned helps to learn new sensory-motor and cognitive functions. Recreational sporting practice encourages learning sequences of a task and maintain high concentration with less energy expenditure than usual.

In general, the most important benefit of sport is **social inclusion**. Physical and cognitive limitations often tend to exclude people with ASD from sports activities. Sometimes it happens that parents are afraid to take their children to sports associations, or usually children themselves are not happy, as they are unable to integrate well in the various sports activities. So, the playful component in sport is fundamental. Fun and play this must be the basis of sports activities, as they affect the motivation of people with ASD.

Sport can lead to more interactions with peers. This leads to greater social interaction, which does not happen if children and adults with ASD remain stuck in their daily routines. If, on the other hand, they practice a sport in which they can come into contact and relate with their peers, they make new friendships and strengthen their physical and cognitive capacities. To obtain these improvements it will take time and a lot of patience, but it is also important that sport is practiced consistently.

5.3 Individual sports and team sports: the best sport disciplines for individuals with ASD

Recent literature data suggest that sports motor activity may represent a useful approach to support young people with an autism spectrum disorder. In 2016 the well-known journal "Autism" published a review that analysed 13 different studies with the aim of verifying the impact of sports activity in people with ASD and, in particular: **stereotyped behaviours**, **cognitive skills** with reference to **socio-emotional behaviour.**

Which sport to choose for a person a child or a boy with autism spectrum disorder? In general, the choice of a sport is quite personal, so it is not possible to establish exactly which sports may be best suitable for each individual.

The results show how the continuous and regular commitment to sports such as **Horse Riding**, **Martial Arts**, **Swimming**, **Dance** has a positive impact on the health of young people with autism in terms of reducing symptoms and improving the quality of life. Through the practice of sporting activity, young autistic people can mature and increase their integration skills, their autonomy and self-realization. Furthermore, taking place in a social context and using play to learn, sport represents the ideal means to increase their chances of socializing while having fun. Sport teaches young people with ASD to learn techniques useful to improve their athletic and psycho-aptitude performance by increasing their sense of self-esteem, psycho-emotional and psycho-motor control and at the same time reducing anomalous behaviours and stereotypes. Sport activities create the conditions for better integration of these young people. The most important role is attributed to managers and trainers as they promote participation in training sessions or other sporting events and influence their mood and motivation through their ability to make them feel strong, happy, and safe.

Trainers must display a good psycho-emotional balance, together with a strong personality and good soft skills like empathy and active listening. Professionals who can perform the role of a trainer are physiotherapists, graduates in motor science, professional educators, possibly in possession of specific skills in the field of specific sports therapy for individuals with autism.

Before starting a sport activity with an individual with ASD, trainers must consider a series of factors: knowledge of individual characteristics such as limits and strengths. After establishing an interpersonal relationship, by using simple syntactic and lexical structure and allowing effective communication, it is good practice to encourage the participant to express his or her learning potential in such a way as to create the conditions for a highly inclusive environment.

Continuous sport practice helps achieving important improvements such as Improvement of skills related to the cognitive sphere, like the ability to organize and space-time orientation, attentional functions (maintenance, shifting and distribution of attention) and memory functions (procedural memory, short and long-term memory, operational memories) higher level (planning and programming, cognitive flexibility, problem-solving) Improvement of psychomotor functions both in terms of psychomotor control (attenuation of stereotyped movements, manifestations of restlessness and agitation, kinetics in movement) and quality of psychomotor functions (oculo-manual coordination and bimanual, gait pattern, attenuation of motor impediment notes). Improvement of muscle tone-tropism and strength, postural control, and dynamic coordination in global and segmental mobility. In some cases, a specific sport activity can be prepared as part of an individual rehabilitation program, which should be coordinated by a multidisciplinary team: a specialist doctor, psychologists, social workers, therapists, and professional educators. Such programs have been put in practice at AIAS neuro-psychomotor rehabilitation centres in Melfi and Matera. Equestrian sport is one of the sport's most widely practised by patients with autistic syndrome. Due to its considerable importance in therapeutic rehabilitation fields, it is also known under the name of TMC horse therapy or hippotherapy or equestrian rehabilitation.

5.4 Table Tennis

Experiences documented in scientific literature and supported by those carried out at the AIAS neuro-psycho-motor rehabilitation centre in Matera, highlighted Table Tennis as a sport that helps specific intervention with a high therapeutic rehabilitation value in the context of occupational therapy programs adopted with ASD. Table tennis

competitions create a high recreational context with favourable effects on mood, appropriateness of emotions and psycho-emotional control, sense of self - esteem, and good management of anxiety. In this regard, a continuous sporting activity is believed to cause an increase in the levels of endorphins, serotonin, and other endogenous opiates, especially in the brain, capable of inducing a state of wellness in each individual. Prevalent activation of aerobic metabolism with favourable effects on the cardiovascular function on the bodyweight on the sense of hunger and satiety.

5.5 Swimming

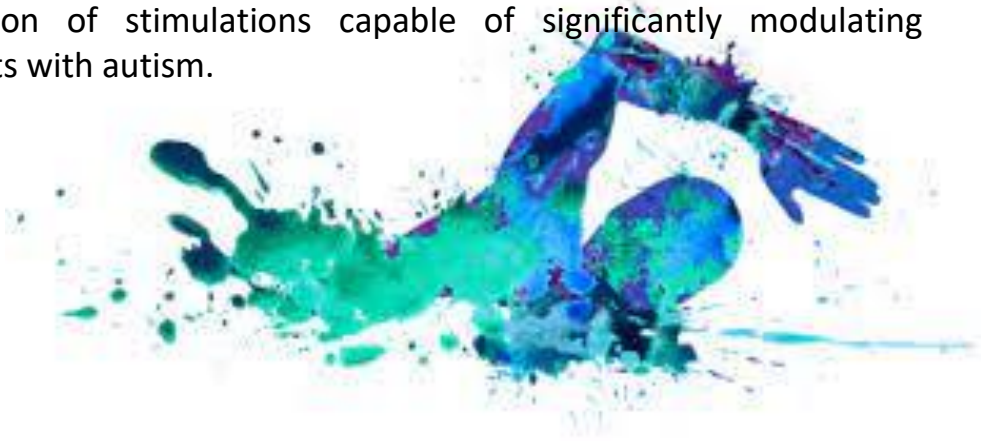
Swimming strengthens body self-awareness and increases self-esteem. This is certainly a winning feature of individual sports because stress and anxiety levels are very low as athletes do not have to compete or collaborate with others. The aquatic environment generally arouses psychologically positive reactions in the human individual, for which it is considered a particularly suitable habitat for carrying out rehabilitative activities. These positive attitudes would be linked to the unconscious memory of the experience lived by the foetus in the amniotic fluid from the earliest stages of intrauterine life. Generally speaking, motor activities in the water, are considered valid tools in treating a wide range of morbid pictures, including autism spectrum disorders According to recent research, water is a soothing environment that emphasizes gentle and repetitive motion. For children with autism spectrum disorder, water has a calming effect and reduces any enervating noises. Pool time helps students cope with everyday stresses outside of the water as well. Recent literature data indicate that water sports

activities practised in a regulated and continuous manner represent a valid tool for integrating traditional rehabilitation therapies and young patients suffering from neurodevelopmental disorders, such as autism. Young subjects with ASD show pleasure in carrying out activities in the water as it has positive effects on psychophysical well-being and improved performance in the school environment. The patient's interaction with the aquatic environment determines an increase in the learning ability and the improvement of the development of his cognitive-behavioural, sensorimotor, social and communication skills. An emblematic example of the use of motor activity in water in people with ASD is represented by the **Multi-systemic Water**

Therapy (MWT), also known as the **Caputo-Ippolito method**, from the name of the authors who first conceived and used it. This type of water therapy intervenes on the different functional systems of the patient (Relational, cognitive, behavioural, emotional, motor sense, and motivational) and is part of a global rehabilitation project that has as its outcomes above all the improvement of the relational, emotional, and social integration that would be the consequence of the acquisition of swimming techniques and skills during the treatments. Results obtained using MWT include:

a) reduction of problematic behaviours related to self and hetero-aggression, stereotypies and maladaptive behaviours, channelling of aggression in a functional way, Increased body eye contact,
b) Increased attention span and imitative skills,
c) Improved motor skills both in and outside water
d) Increased emotional expression (recognition of fear, anger, happiness, shame)
e) Improvement of body posture time in relation to the different contextual conditions,
f) spontaneous recognition of reference figures (therapist teacher), a
g) ability to share the game Improvement of psycho-social skills (sharing respect for social rules, sense of belonging),
h) Improvement of relational skills especially with peers, increased expected capacity, increase the sense of self. Improvement of verbal and extra-verbal communication, Improvement of personal autonomy.

In line with the literature data above, it is also the evidence related to the experiments conducted at the psycho neurorehabilitation centres AIAS Melfi and Matera and relating to the inclusion of physical activity in water to supplement traditional therapies (psychomotor, physiotherapy, occupational therapy), in the rehabilitation path of autistic subjects. All this confirms the important integrative role played by water in the production of stimulations capable of significantly modulating neuroplasticity in patients with autism.

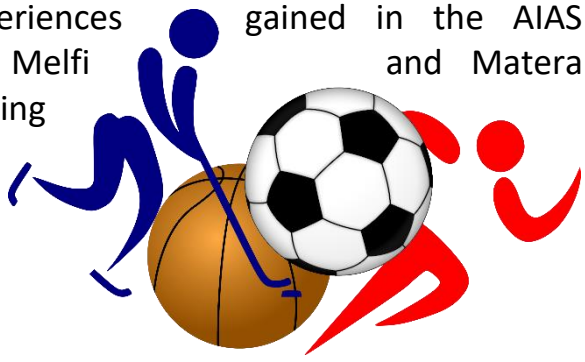


5.6 Athletics

Athletics is the queen of sporting disciplines. In fact, some specialities like those included in Modern Athletics are recognized as very ancient origins, such as running, jumping, shot put, javelin, which were practised in the Olympics of ancient Greece. Athletics are also generally included in those sports activities indicated for young people with ASD, particularly those characterized by hyperactivity and high energy levels. There is scientific evidence that indicates the importance of athletics in its various specialities in promoting the psychophysical well-being of the young autistic. Neurophysiology studies have shown the presence during the running activity of a particular electrical activity of the brain characterized mainly by alpha waves, those present while we're sleeping, or when our body and mind is in relaxation.

Another interesting experimental data are those related to the abundant production of endorphins, substances released by the body during running, with a chemical structure in action similar to opiates, able to partially counteract fatigue as well as generate a sense of slight physical euphoria, and psychological. The experiences gained at the AIAS neuro-psycho-motor rehabilitation centre in Matera confirm the usefulness of the practice of the various Athletics specialities in autistic patients with the role of complementarity with respect to traditional rehabilitation methods. Benefits found in autistic patients dedicated to the continuous practice of Athletics specialities such as running, long jump, hammer throwing, etc., include not only the improvement of skills related to the psycho-emotional, psychomotor sphere with favourable effects on relational spheres and psychosocial, an increase in cognitive performance and in the fulfilment of tasks of daily life. Also evident are the improvements related to generalized joint ROM in tone-tropism and muscle strength, static and dynamic balance, postural control, and dynamic coordination in global and segmental mobility.

All this is clear evidence of how the synergistic interaction of traditional rehabilitation methods with complementary sports motor activities can allow a more effective action on the neuroplasticity of autistic subjects, limiting their maladaptive behaviours and favouring the development and/or enhancement of skills neurophysiological. The data provided by the scientific literature and the experiences gained in the AIAS neuro- psychomotor rehabilitation centres of Melfi and Matera attest to the fundamental role played by sporting activity in promoting well-being and physical and mental health of subjects affected by the autism spectrum.



5.7 Equestrian Rehabilitation

AIAS Matera Melfi deals with Equestrian rehabilitation since 1990 and is divided into three areas of intervention: hippotherapy, equestrian re-education and horse riding for young and adult people with disability. Equestrian rehabilitation is indicated to treat pathology associated with the central nervous system, post-traumatic or progressive infantile cerebral paralysis, degenerative pathologies, multiple sclerosis and orthopaedic pathologies, kyphosis, mild scoliosis, pervasive developmental disorders (Autism), Borderline states, personality disorders, behavioural disorders, mental insufficiency, sensory deficits and down syndrome.

The multidisciplinary team consists of rehabilitation therapist specializing in an equestrian rehabilitation riding instructor specializing in equestrian rehabilitation, medical specialist, a psychologist, a professional educator. In the specific case of autism, horse riding rehabilitation has the following positive effects:

- improve their motor and sensory skills
- favour the aggregation of social relationships
- encourage personal autonomy

5.8 Clinical Case

1

Name: Maria Chiara

Age: 18

Diagnosis: autism spectrum disorder with a moderate cognitive disability

Therapy: global psychomotor and speech therapy

Year: 2005. Sessions in equestrian rehabilitation began in 2010, with a frequency of 1 session per week

2

Name: Giulia

Age: 15

Diagnosis: a pervasive developmental disorder of autistic type in a girl with medium-grade cognitive retardation and emotional regulation disorder

Therapy: global psychomotor and speech therapy

Year: 2005. Sessions in equestrian rehabilitation began in 2010, with a frequency of 1 session

Initial observation: 1) Chiara shows a deficit in social reciprocity, discontinuous attention, her way of communicating is redundant, monotonous, characterized by phonetic and phonological errors. She also displays hypersensitivity to odours and elusive eye contact. 2) Giulia doesn't communicate verbally, she presents motor stereotypes, total closure to the interaction with the horse and the horse-riding environment.

Hippotherapy phase: this phase consists in educating Maria Chiara and Giulia to approach the horse: they get in touch with the horse, understand his behaviour, explore spaces and learn how to take care of the horse and clean his box, how to use harnesses, feeding, etc.). In a second phase they learn to hold the reins, stop, leave, etc. It is centred on the horse's movement as a therapeutic tool, without the active intervention of the subject. Details like accept to wear a cap (riding helmet) are small signs of acceptance and confidence with the horse. The Assisted Ascent contains and physically accompanying the child.

Assisted Ascent: in this phase there is a forced contact with the horse and the operator is called to listen and slowly explain to get on top of the horse.

Gait: is a sinusoidal three-dimensional movement. The gait takes place in four bars and 4 times. The gait step has a continuous shifting of the rider's centre of gravity and improvement of balance. It has a pleasant and calming effect.

Equestrian re-education: in this phase, the therapist asks the person to actively participate in the session to guide the horse independently. Exercises are performed to increase level of motor autonomy, for space-time orientation, to increase ability of autonomous riding, to strengthen the relationship between horses and the therapist. An important aspect to take in consideration is to distribute well the weight of the saddle on the front and rear of the horse, back straight, reins pushed forward, torso neck and head stretched upwards, legs along the side of the horse, greater weight load on the heels in the brackets. These simple practices enable a feeling of safety for the rider and freedom of movement for the horse.

Recreational horse-riding: when the transition from therapeutic, rehabilitative riding to recreational-sporting riding occurs, all technical aspects of horse riding are well-known and well-performed, the purpose is no longer recover but to improve the sport performance. In this phase, socialization, and integration with the members of the Equestrian Club is quite important.

6 Conclusion

This guideline represents a useful tool for sport volunteers and social workers who are willing to work in an inclusive environment where they can train children and young people with autism spectrum disorder.

The guideline includes experiences shared during the transnational meetings and visits at our partner's facilities. Meeting their pupils and attending some of their training sessions helped all participants to understand better the **important role for sport professionals** when it comes to find the best possible way to establish a connection to train and work with people with ASD and how to communicate with their parents, guardians, or other caregivers. A set of guidelines have been listed by researchers of the project partner Spring Jurmala, explaining how sport specialists can find out useful information about people with ASD who practice physical activities. Best practices regarding training approach and strategies through activities and treatments like kinesiotherapy, water sport, judo, and gymnastics have been warmly shared among all partners by teachers and trainer from Autism Baia Mare, Spring Jurmala, Autismo Burgos and the Association for the care of Autistic Persons. Moreover, Fondazione Stella Maris provided a short overview of the clinical aspects of ADS and analyzed aspects of language and social communication together with motor development to help understanding early diagnosis to provide them assistance from the beginning with physical and cognitive activities (early-rehabilitation) which helps them prevent and mild common symptoms of autism spectrum disorder like stereotypical behaviours or relational issues.

A set of guidelines has been drafted regarding the topic of management of problem-behaviours in a sporting environment where trainers and sport volunteers can learn to observe and elaborate strategies to prevent or intervene on stereotypical or aggressive behaviours, as well as reinforcement techniques. The adequate use of the techniques described in the guidelines allows to modulate children's behaviour, increasing the frequency of positive behaviours and decreasing dysfunctional or unwanted behaviours.

Nowadays, sporting activities are considered as a relevant social inclusion tool. The chapter autism and sport is focused on the best sports disciplines for individuals with ASD and focuses on the experience gained at the AIAS neuro-psycho-motor rehabilitation centres of Melfi and Matera, particularly in equestrian rehabilitation (hippotherapy) and Water Multy Systemic Therapy (WMST), showing and explaining how sports like swimming and horse riding can provide a contribution to improve the neuro-psycho-motor skills, completing and integrating traditional techniques and

improving their inclusion into social and relational life. To better understand benefits of the mentioned activities, AIAS also provided some case-studies.

7 Annex

1) AUTISMO BURGOS (SPAIN) **: Physical exercise and Health – Tips to promote sport at home**
2) ASSOCIATION FOR THE CARE OF AUTISTIC PERSON (CROATIA) : **Youth Mobility Assessment Sheet**