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Dimitra Koutsouki, Thomas Nikodelis, Aikaterini Asonitou, Sophia Charitou, Ioannis Ntampakis, Valeria Bălan, Ana Maria Mujea, Tina Jeromen, Jana Čander

Swim your Way

Guide to teach swimming to people with disabilities

Publications Athletic Club Asterias

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PROJECT OVERVIEW

Swim your Way is an Erasmus+ SPORT (Small Collaborative Partnership) project which was carried out by five organizations from Greece, Italy, Romania and Slovenia.
The partnership involved organizations operating in different areas, with different yet complementary competences, specifically, two Universities, two swimming clubs and a nonprofit association.

The project was focused on children with disabilities who are often prevented from taking part fully in society because of environmental and attitudinal barriers. People with disabilities are limited in opportunities to be as physically active as people without a disability. Therefore, the aim of this project was to create a well-structured Guide on how to teach swimming to children with disabilities according to their differing needs, so that they can have full access to sports activities, which is in line with the European Disability Strategy 2010-2020.

For this purpose, through the realization of three workshops, four specific categories of disability were selected from the available participants at each partner association, specifically, Autism Spectrum Disorder (ASD), Neurological based Disability, Physical injuries Disability and Down Syndrome. Each partner designed and performed a series of swimming lessons adapted to its assigned disability group's needs, apart from the nonprofit association.

At the end, all the "things that work best" in the teaching process were selected and they were included in the **Swim your Way Guide** which is offered as an Open Educational Resource to other professionals of the sport, swimming instructors, teachers and trainers, available in five different languages (EN, EL, IT, SL, RO) and it is expected to have a cross sectional long term positive effect to the adapted swimming area, helping people with disabilities to participate in swimming.

Details about the Consortium

Coordinator:

Kolymvitikos Athlitikos Omilos Asterias-Swimming Club Asterias (Katerini, Greece)

Asterias is a swimming club in Katerini, which offers swimming lessons for children from the age of two, disabled children (mostly ambulatory) and adults. It is equipped with facilities for disabled people. Its Managing Director is specialized in biomechanics of swimming and has realized analysis for children with cerebral palsy. Both he and the head coach have been honored by the Ministry of Education for the program of teaching swimming in the elementary schools of Greece.

Partners:

National and Kapodistrian University of Athens
School of Physical Education and Sport Science
Laboratory of Adapted Physical Activity/ Developmental and Physical Disabilities (Greece)

HELLENIC REPUBLIC
National and Kapodistrian University of Athens

The School of Physical Education and Sport Science belongs to the National and Kapodistrian University of Athens (UoA) and it is the oldest institution of higher education in Greece as well as the Balkan peninsula and the Eastern Mediterranean region. The School of Physical Education and Sport Science specializes in the study, research and teaching of all expressions of Movement of the Human Body through a holistic and in-depth interdisciplinary program that includes the natural sciences, the social sciences and the humanitarian sciences. The Laboratory of Adapted Physical Activity/ Developmental and Physical Disabilities is one of the three basic and independent laboratories of Theoretical Sciences Sector of Physical and Sport Science School of UoA. The Laboratory activities include education not only for undergraduate, but also postgraduate students.

Moreover, the Laboratory contributes to the enhancement of the value of education and research in the Physical and Sport Science School, as well as it elaborates research educational programs for postgraduate students in Adapted Physical Activity (APA). The Laboratory specializes physical education teachers and coaches, and it engages in basic and applied research in APA. It also organises seminars, conferences, lectures, speeches, or other scientific events and cooperates with personalities and scientists, that their specialization is relevant to the Laboratory's cognitive subject matter.

The National University of Physical Education and Sports Bucharest (Romania)

The National University of Physical Education and Sports Bucharest (UNEFS) is one of oldest public institutions founded in Europe, in 1923. Each year it offers degree programs - bachelor, master, and doctoral programs, for about 1000 students, in the physical education, sports and kinesiotherapy areas of studies. The high level of educational services is recognized by the Romanian Agency of Quality in Higher Education. UNEFS develops and implements science in its domain of activity, at national and international levels, promotes its own and the universal scientific values, methodologies, inventions, promotes international cooperation and integration into the European higher education system, from a structural, qualitative, and economic-effective scope. UNEFS promotes scientific research oriented to the development of physical education, sports and kinesiotherapy field and its relationship with other scientific areas, from an interdiscipl

Športno društvo Riba (Slovenia)

Športno društvo Riba is a swimming club, officially a sports association founded in 2002 by a group of young swimming enthusiasts and ex-competitive swimmers, brimming with ideas and eager to put them into practice. The club has members aged from 3 to over 60 and they teach swimming to children, adults, seniors, disabled, disadvantaged etc.

In their staff they have licensed instructors, swimming teachers and coaches (licensed by Slovenian Swimming Association) and professionals who gained their degree from the Faculty of Sports (University of Ljubljana). The club tends to engage all their swimmers in a dual career – their wish is when one finishes with competitive career, he/she can stay connected to swimming as a master swimmer and/or a trainer, instructor or coach. They also organize events for disabled children and adults, and they tend to integrate all abilities and all age groups if the pool the timing and the desire of people involved enables such a program. Moreover, they are very engaged in spreading the importance of Master swimming for competitive swimmers over the age of 25 (or even 18 if one finishes earlier) and their swimmers regularly attend World and European championship competitions. Lastly, every year they organize at least two international swimming competitions where anyone can compete in the most popular disciplines.

Associazione Euphoria (Italy)

Euphoria is an Italian non-profit organization aimed at promoting and giving visibility to European issues, encouraging debate, raising awareness, and changing attitudes via dissemination activities, communication and information campaigns, well-established local and European networks and decentralized cooperation activities. The organization was founded in 2014 by three women who wanted to share their experience gained whilst working for and in the European Commission in political affairs, communication, project design, project management and financial management. Today, all members of the Association have an international background deriving from more than 20 years of experience in working, learning, and teaching in multicultural and international environments. The association organizes different events especially in the field of education, training, EU citizenship and youth policies. In collaboration with other associations, trade unions and universities Euphoria has developed tailor made courses for teachers, headmasters and schools' administrative staff on EU projects and European educational affairs reaching more than 2000 school staff participants from Italy and all over Europe. Moreover, Euphoria organizes workshops and courses for students to boost their interest and participation over EU issues and to develop skills useful for the 21st century society, such as project management and digital skills.

Part A.
Review of Literature on the Benefits of swimming in populations with disabilities

Introduction

The purpose of this scoping review is to produce a descriptive overview which will allow a greater understanding of the aquatic therapies' potential benefits for children, adolescents and adults with neurological disorders [central and peripheral neurological disorders (ND), autism spectrum disorders (ASD), intellectual disability (ID)] and musculoskeletal disorders (MD). Additionally, it aims is to determine if and how outcomes have been evaluated. Literature was searched through Medline, SportDiscus, Google Scholar and Google. This review is composed by five sections.

The first section explores particularly physical and psychosocial outcomes associated with different types of water-based interventions promoting maintenance of healthy activity levels.

The second section refers to the implications of using aquatic therapies to assist in the design of interventions for people with autism spectrum disorder (ASD).

And the third section describes the potential benefits of aquatic therapies for people with a neuromuscular disease (NMD).

The fourth section refers to the implications of using aquatic therapies to assist in the design of interventions for people with physical injuries and the fifth section refers to the implications of using aquatic therapies to assist in the design of interventions for people with Down syndrome.

Section 1. Benefits of aquatic-based interventions for people with and without disabilities

(Professor Dimitra Koutsouki, Dr Katerina Asonitou, Dr Sophia Charitou, P.E. Teacher Anna Galaiou)

The therapeutic properties of water can be traced back to the ancient Egyptian, Greek, and Roman civilizations where bathing was a common practice for curing illness. Hippocrates and Plato, two of Greece's famous philosophers, wrote for about the benefits of hydrotherapy which today is known as 'aquatic therapy'. The use of water to treat both physical and psychological diseases in the 18th century developed different types of aquatic-based interventions over the centuries for improving health (Gianfaldoni, 2017).

There is a large body of literature on aquatic-based interventions for individuals with neurodevelopmental disabilities specifically autism spectrum disorder (ASD) and intellectual disability (ID), as well as neurological disabilities such as cerebral palsy (CP), Parkinson's disease (PD), spinal cord injury (SCI), spina bifida (SB), muscular dystrophy (MD), multiple sclerosis (MS) and acquired brain injury (ABI). From a scoping review three main aquatic-based intervention categories were identified, swimming, hydrotherapy and scuba diving with the most abundant papers in the first two categories. The most common disabilities included cerebral palsy, spinal cord injury, Parkinson's disease, autism spectrum disorder and intellectual disability.

This is to be expected for a number of practical reasons including that both (swimming and hydrotherapy) have been utilized as therapy services for many years, likely with greater funding support, than the other intervention categories. With respect to swimming, more research has been conducted in elite level swimmers with a disability and less for general physical activity and leisure in these population groups (Burkett, 2017). This is supported by the number of measures for athletic performance-based outcomes found in these studies associated funding for Paralympics and other athletic competitions. Regarding to hydrotherapy a possible explanation for the high number of studies is the increase in the number of coaches or/and health professionals delivering these services resulting in an increased opportunity for patients'/clients' participation (Wilson, Lewis, & Murray, 2009). Shortly, hydrotherapy and swimming have been recognized as rehabilitation modalities for people with special needs (Becker & Cole, 2004; Ruoti, Morris, & Cole, 1997).

A. Hydrotherapy (or aquatic therapy)

Hydrotherapy (aquatic therapy) refers to treatments and exercises performed in water for relaxation, fitness, physical rehabilitation and other therapeutic benefits. Typically a qualified aquatic therapist gives constant attendance to a person receiving treatment in a heated therapy pool. Aquatic therapy techniques/methods include “Ai Chi”, “Aqua Running”, “Bad Ragaz Ring Method”, “Burdenko Method”, “Halliwick”, “Watsu” and other aquatic exercise programs.

Nowadays researchers and clinicians are interested in the evidence of particular properties of water such as buoyancy, hydrostatic pressure, viscosity, and temperature as mechanisms behind positive effects of this aquatic-based intervention (Becker, 2009; Mooventhan & Nivethitha, 2014).
The scientific literature regarding the benefits of aquatic-based treatments suggests that they can result in decreased pain, improved mobility, and increased blood flow (Becker, 2009; Mooventhan & Nivethitha, 2014; Wardle, 2013). Most of the research has been focused on hydrotherapy particularly for people with pain related conditions such as rheumatic arthritis, osteoarthritis and lower back pain (Enblom, Wicher, &Nordell, 2016). However, some neurological conditions have also featured in systematic reviews on patients/clients with cerebral palsy (CP) (Roostaei et al., 2017), spinal cord injury (SCI) (Ellapen et al., 2018), Parkinson’s disease (PD) (Pinto et al., 2019), autism spectrum disorder (ASD) (Mortimer, Privopoulos, & Kumar, 2014) and acquired brain injury (ABI) (Mehrholz, Kugler, & Pohl, 2011).

These reviews support the evidence for physical effects, such as improved gross motor skills (Roostaei et al., 2017), reduction in muscle spasticity, improved underwater gait kinematics, decreased cardiometabolic risk profiles (Ellapen et al., 2018), improvements to balance and functional mobility (Pinto et al., 2019), as well as improvements to activities of daily living and strength (Mortimer et al., 2014).
Just like improvements in physical function and skills, psychosocial enhancements are also important for the overall health and wellbeing (Tough, Siegrist, &Fekete, 2017). Hydrotherapy is suggested to improve social interactions & behavior for participants with ASD (Mehrholz et al., 2011). However, there is adequate research exploring both physical and psychosocial effects of this intervention.

Aqua Jogging Technique

A very important part of hydrotherapy is aqua jogging.
The therapist by controlling the appropriate water temperature, the correct posture of the patient in the pool, the special equipment and the running techniques, creates the appropriate conditions for aqua jogging.

Aqua jogging benefits in swimming pool:

1. Improving aerobic capacity - cardiorespiratory stimulation
2. Weight loss
3. Feeling well and reducing stress
4. Improving muscle strength - endurance
5. Improving neuromuscular coordination and joint coordination
6. Preparation of injured tissues for running on more "dry" surfaces.

Proper posture:

The mechanical kinematic model of running in water is similar to that of land. The body leans slightly forward from the vertical position (bending the hips with the spine in a neutral position). In a deep pool there is no contact of the limbs with the bottom - as the limbs move in space, the muscles of the torso are activated to stabilize the body thus improving coordination and proprioception. In the shallow pool where there is contact with the bottom, an increase in muscle strength is achieved.

Proper posture requires:

1. The head straight with the torso,
2. The chest high,
3. Shoulders in the same straight line as the hips,
4. Tight abs and gluteus.



Special running equipment:

1. Vest or float belt.
2. «Paddles»- for resistance in the hands or dumbbells.
3. Flippers or other shoes specifically for water.

Running Techniques:

1. Steady running stride

It is a running technique that is more like running on land. The knee is in greater flexion while when the extremity of the foot is extended it is in plantar flexion.

2. Oversized stride

It is used to improve mobility and strength. First we lift the knee and it goes forward while at the same time the hind leg is pushed as far as possible extending the knee joint. The tip of the foot follows the respective bend or extension of the knee.

3. Walking stride

The upper and lower extremities are in full swing. The tip of the foot in the forward movement comes in dorsal flexion and in the posterior in plantar flexion.

4. Skipping

The knee bends horizontally as the other leg is extended.
The tip of the foot is always in a dorsal flexion 90o when performed in a deep pool, while it follows the movement during the landing phase at the bottom of the shallow pool. The arms go parallel to the upper torso and the elbows are bent 90o.

5. Asterix stride

It particularly refers to the "steady running" technique. The stairwells are shorter and circular.

A. Aqua jogging is a very useful and enjoyable part of the hydrotherapy program, where the therapist has the ability to safely implement the rehabilitation program and the patient can run while keeping the injured tissues partially protected (Karamanidou, 2017).

B. Aqua training

Aqua training in the pool is a method that requires movements and exercises in the water for the purpose of rehabilitation of diseases.



Advantages:

Aqua training improves:

1. Cardiorespiratory ability,
2. Flexibility,
3. Speed,
4. Balance,
5. Proprioception,
6. Skillfulness,
7. Strength,
8. Endurance,
9. Psychology,
10. Patients'/clients' ability in specific movements of his/her sport.

Indications:

1. Reduced ability to exercise under normal conditions.
2. Incomplete torso stabilization.
3. Pain.
4. Weakness.
5. Reduced active range of motion.
6. Abnormal gait.
7. Decreased respiratory capacity.
8. Blood circulation problems – swelling.
9. Muscular spasm.

Contraindications:

1. Fever,
2. Urinary incontinence,
3. Open wounds,
4. Infectious diseases,
5. Skin diseases,
6. Psychiatric reactions to water,
7. Heart problems**,**
8. Low lung vitality,
9. Epilepsy,
10. Kidney disease.

Special equipment:

The equipment is used to change the intensity of an exercise by adjusting the trajectory, the length of the lever, the resistance surface, the speed of movement, the effect of gravity.

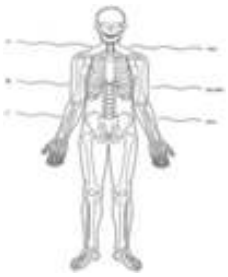



The equipment consists of:

1. Ring-shaped elastic tubes of various diameters and thicknesses.
2. Floating belt - long belt made of foam plastic with adjustable strap.
3. Water dumbbells.
4. Resistance board - made of foam.
5. Plastic hollow stick.
6. «Paddles»- for resistance in the hands.
7. Wrist and ankle weights (dumbbells) in various sizes.
8. Ankle rings for floating -foam material.
9. Elastic straps - for resistance exercises.
10. Stairway - a large and stable surface of various heights located at the bottom of the pool.
11. Swimming pool flippers with short fins.


Effect of buoyancy:

The patient moves more easily in the water as the weight on the joints decreases due to buoyancy. On land the center of gravity is in front of the sacrum, while on the water it is at the level of the lungs. So depending on the depth of the pool, the degree of discharge also changes.
In a deep pool the patient feels 10% of his body weight, when the water reaches the chest he feels 25% and when the water reaches in the middle of the body he feels 50%.As it progresses, that is, it becomes shallower and the difficulty of running increases.



Swimming pool temperature:

The ideal water temperature is 26-30 °C.

Program parts':

Each **aqua training** program includes:
1. Warm-up- always performed first and aims to increase body temperature and prepare it for the requirements of the following program.
2. Stretching- is done passively or actively in order to observe a slight deformation of the tissues without causing damage.
3. Muscle strength and endurance exercises - depending on the phase of recovery from the injury and the goal of the therapist.
4. Relaxation - to remove metabolic byproducts that accumulate during exercise.

Therapeutic exercise in the pool is a pioneering and enjoyable approach in the field of rehabilitation, where the patient under the proper guidance of the therapist has the ability to move from the very first stages of injury (Karamanidou, 2017).

C. Scuba-therapy

Hydrotherapy and swimming are well known aquatic-based interventions in the literature. Scuba-therapy on the other hand which is a newer water-based intervention is limited in research. While participants in hydrotherapy have a partial immersion, Scuba-therapy allows participants to have access in a completely underwater environment, including the utilization of Scuba equipment (buoyancy and breathing devices), in a controlled or uncontrolled environment (pool or ocean). These services compose more complex conditions with particular features (Pearson, 2014).

Scuba interventions are less commonly reported throughout the literature for people with disabilities. Possible explanations for limited research are the relatively new types of services and the lower participation due to no readily accessibility. Studies focusing on individuals with Cerebral Palsy (CP) and Spinal Cord Injury (SCI) featured most in the research followed by Intellectual Disability (ID), Parkinson's disease (PD) and Multiple Sclerosis (MS), with markedly less research on the other disabilities. Research on Scuba interventions focused primarily on psychosocial outcomes included exploration of participants' opinions, thoughts and feelings about the service. Scuba therapy is conducted in both pool and ocean settings and likely overseen by a local dive club or dive instructor. The focus of pool-based Scuba interventions is therapeutic, while ocean-based Scuba is focused on recreation and participation (Gail, &Derek, 2007;Pearson, 2014).

D. Studies' limitations and Future research

It appears that there is limited literature for neurological conditions, such as spina bifida (SB) and muscular dystrophy (MD), as well as an intellectual disability (ID), while only one systematic review explored psychosocial effects for participants (Mortimer et al., 2014). The main limitations of the studies included low sample size, considerable variability in skill at baseline, variability in participants' age and condition severity, lack of intention-to-treat analysis, unclear methods around allocation of participants and variability of therapists (Ellapen et al., 2018; Mehrholz et al., 2011; Mortimer et al., 2014; Pinto et al., 2019; Roostaei et al., 2017).
Hydrotherapy, swimming and other aquatic-based interventions are more likely to explore the physical outcomes of the services such as improvements to physical health, general fitness, physical function and skills. There is less understanding of the psychosocial outcomes of these interventions such as social impacts, levels of enjoyment, motivation to participation and effects on the overall health and wellbeing. The most commonly utilized physical measures include various gross motor scales such as the "berg balance test" and the "timed up and go", while the most commonly utilized psychosocial measures include questionnaires on mood and quality of life. However, future research could be directed to limited use of reporting of mood, fatigue and pain in aquatic-based interventions (Marinho-Buzelli, Bonnyman, &Verrier, 2015).

Source:https://www.pinterest.ch/pin/403072235373079312/
APFT Aquatic Exercises | workouts | Pool workout, Swimming pool.

The aim of this section was to map all aquatic-based services offered across the world which are available for people with neurological and neurodevelopmental disability and the research that has been undertaken. The individual variability in the level and nature of disability (variability in physical and cognitive skills of people with neurological, autism and intellectual disability) suggests the necessity for more robust research designs with larger sample sizes, randomized-control trials, and selection of outcome measures.

So, the evidence for higher quality research in different aquatic-based intervention categories will be increased. Finally, more research across more areas and systematic reviews are required to better understand the potential benefits and effectiveness of aquatic-based interventions for people with neurological and neurodevelopment disabilities.

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Section 2: Swimming and children with autism spectrum disorder (ASD) (Professor Dimitra Koutsouki, Dr Katerina Asonitou, Dr Sophia Charitou, P.E. Teacher Anna Galaiou)

In the present literature review, the impact of aquatic exercises and swimming on children with autism, were thoroughly examined. The majority of the researches are experimental (30 experimental ones). Nevertheless, a qualitative research (with an interview) and two retrospective ones are included. The retrospective researches help us to reach some conclusions after the collection of many similar researches, which in our case are concerned with the impact of swimming on autism.

Water is a really cozy environment (Vute, 2017), both for a child and an adult, regardless of them being part of the spectrum or not, it induces a state of euphoria and well-being and it does not need sophisticated and expensive gear or any kind of special abilities. It goes without saying of course, that the ability to swim is of vital importance to everyone, regardless of their sex, age, body or mind skills (Vute, 2017), let alone children with autism disorder, for whom drowning is the prime cause of accidental death(Alaniz, et al., 2017; Kraft & Leblanc; McIlwain& Foster, 2017). Besides, activities in a swimming pool seem to be very effective for the motor (mainly the crude ones), psychomotor, adaptive and social skills of children with autism (Battaglia, et al., 2019).

The number of children with autism spectrum disorder (ASD) is on the rise in recent years. Autism is a severe disability, usually appearing during the first three years of age and is characterized by communication impediments and other growth and educational problems (Yilmaz, et al., 2004; Ennis, 2011; Mortimer, Privopoulos&Kumar, 2014; Aleksandrovic, et al., 2015). Although it is widely known that exercising is beneficial for ASD people, it seems that these people do not get enough exercise (Fragala-Pinkham, O'Neil &Haley, 2010; LaLonde, et al., 2014). The motor symptomatology in autism has not been well perceived and has not been added in the diagnostic criteria of the ASD, despite the fact that several researches have established the presence of motor disorders in this syndrome (Paquet, et al, 2016) and more in the gross motor skills (Partovi, Sheydaei&Ghasemzadeh, 2018). Studies have proved that exercise especially in water improves the motor skills of individuals with ASD (Caputo, et al., 2018).

Teaching people with ASD, should not be the same as teaching typical children, especially because of their disorders (Aleksandrovic, et al., 2015). So, we need an alternative educational approach which in many cases can be useful even for typical populations. This is the reason that studies were conducted producing some educational tactics which seem to have positive effects on children with autism.

Halliwick method

All studies concerning aqua training and people with any type of disorders are based on Halliwick. This method was evolved by James McMillan in 1940 and introduced people with a disorder to the aquatic environment. Nowadays it has become the basis of many hydrotherapeutic programs, because it adjusts to every person's individual needs (Rojo, 2014). The teaching of the Halliwick aquatic method or the independent water movement of people with special needs (Mohamed, 2017) is based on the known scientific principles of hydrostatics and hydrodynamics. It can be applied to people of all ages with or without disorders. It comprises a mild method of familiarization with the water, especially for people who dread contact with it.

Halliwick philosophy:

- Water Joy
- Teacher /Pupil One to One
- Games while learning
- Group programs
- Equality
- Pleasure
- Teaching process in a logical order
- Focus on skill
- Positive thinking
- The philosophy can also be applied with the assistants

Learning through playing in a pleasant way and the understanding of motion, balance and stability, as well as breath control, are part of the Halliwick philosophy (Vute, 2017). The ten points constitute the base of Halliwick.

The ten point program:

1.Mental Adjustment
2.Disengagement
3.Transversal Rotation Control (formerly Vertical Rotation)
4.Sagittal Rotation Control
5.Longitudinal Rotation Control (formerly Lateral Rotation)
6. Combined Rotation Control
7. Up thrust
8. Balance in Stillness
9. Turbulent Gliding
10. Simple Progression and Basic Swimming Movement

It follows a logical pattern, so every step must be accomplished to make a swimmer truly capable in water. The Halliwick philosophy, as well as in well-being and euphoria, it is the prevalent sense of freedom, independence and pleasure.The main target is not the perfect swimming style. The Halliwick swimming philosophy is a carefully designed program leading to more effective teaching of swimming. It provides guidelines with well-defined and progressive aims for all levels of skill. The instructors are encouraged to develop their own personal teaching style (Vute, 2017).

Teaching strategies in an aquatic environment for children with ASD

The survey of Kraft, Leblanc & Culver, conducted in 2018, was aiming to propose effective strategies to the swimming instructors for their lessons, regarding children with ASD. It's a qualitative case study approach, where data collecting included: demographic questionnaire, observations and interviews. An observation period followed, when the main researcher was observing the swimming instructors in action, and kept notes.
Observations took place twice during swimming lessons in order to pinpoint the strategies used by the instructors, so in the course of the following interviews to be able to investigate how they learned these specific strategies. Every lesson lasted approximately 45 minutes and included either an individual or a group lesson (3 swimmers). After two periods of observations, interviews followed.
The results of this survey indicated that special training supplied the instructors with techniques and information which could be applied during their lessons with swimmers with ASD, instead of relying solely on their basic training focusing mainly on acquiring swimming skills.
The following year the same researchers wanted to provide the swimming instructors with some techniques for the teaching of entertaining water programs, for kids of the autism spectrum. More specifically, this paper will discuss four teaching techniques for the facilitation of aquatic activities for children with high-functioning ASD:

1) Practice using positive feedback. The positive language is effective for the adoption and correction of skills. Trainers can use encouraging language while describing correctional procedures which will improve the movements of swimmers. For example, the trainers can verbally encourage the swimmers by saying "terrific work holding your toes" which is a technique working well for the improvement of acquired skills (Kraft, 2016).

2) Finding an appropriate form of communication. This system comprises of optical representations of objects and activities in the form of images to function as social stories. For example, a trainer can provide the swimmer with an image of a child diving in a pool to visualize their expectations for a given activity in connection with an oral instruction.

3) Educating through physical guidance. The trainers use physical guidance by placing the swimmer to the desired position, thus enabling them to feel the physical movement. A technique like holding the swimmer's arms while moving them in a circle is a way of guidance which corrects the movements in order to develop their swimming skills (Kraft, 2016). However, some children prefer to use a helping device instead of a physical contact with the trainer.

4) Providing opportunities for self-determination. The trainers encourage swimmers to make their choices, but only in specific instances during the activity, when it would be most beneficial to the swimmer. By asking questions like "would you like to train in breaststroke or in backstroke now?" you give the swimmer the impression that they control the activity, while at the same time allows the trainer to retain the structure of the lesson (Kraft, 2016).

These strategies are not appropriate for all children with ASD, particularly those who present tactile defensiveness.

Table 1

Four Strategies for Teaching Children with ASD and Additional Resources of Reference

Strategy*	1. Positive Feedback	2. Appropriate Communication	3. Physical Guidance	4. Opportunities for Choice	Resources for Peer-mediated Instruction
Examples	• Physical reinforcement (high five, thumbs up) • Language/verbal communication (short and direct) • Reward systems (first-then)	• Mirroring / modeling • Augmentative alternative communication systems (e.g., picture exchange communication system [PECS])	• Physical cues/ prompting (circling swimmer's arms for front crawl) • Deconstructing skills/task analysis (introduce breast-stroke in smaller, manageable sections)	• Integrate choice within routine • Pair choice with visual supports	• Integrate peers and/or siblings into aquatic programs to enhance interactions (Chu & Pan, 2012).
Additional References	• Reinforcement Module: http://afirm.fpg.unc.edu/reinforcement • Verbal communication: Van Lith, Stallings, & Harris (2017) • Reward systems: Mancil & Pearl (2008)	• Modeling Module: http://afirm.fpg.unc.edu/modeling • PECS Module: http://afirm.fpg.unc.edu/picture-exchange-communication-system	• Prompting Module: http://afirm.fpg.unc.edu/prompting • Task Analysis Module: http://afirm.fpg.unc.edu/task-analysis	• Van Lith, Stallings, & Harris (2017) • Visual Supports Module: http://afirm.fpg.unc.edu/visual-supports	• Peer-mediated Instruction and Intervention Module: http://afirm.fpg.unc.edu/peer-mediated-instruction-and-intervention

*Strategies should be adapted and used to meet students' individual needs.

Source: Kraft, Leblanc & Culver (2019)

These techniques aim to support the trainers' skills and to facilitate the aquatic activities of young people with ASD, as funding for the trainers is currently limited.

Aquatic programs following some surveys and showed significant statistical results for people with ASD.

A technique used by the Turks in 2010 and in 2015 was encouragement 'most to least' prompting (MLP).In the first survey (Yilmaz, et al 2010), the participants were 3 nine-year-old boys with ASD. The main aim of this study was to teach the plain evolution of swimming skills of children with ASD. The duration of the study was 10 weeks (3 sessions each week).All sessions were conducted with one to one approach (one trainer - one child).In the 'Most to Least' technique there are three levels of application:

1) *a physical signal is provided along with verbal instructions*, that is, the trainer gives instructions to the trainee, for example he says lay on my arms and prepares - shows his arms for the trainee to lay on so that the trainer can move them in the water. At the same time in this stage verbal endorsement is also offered like "good job".

2) *the trainers offer verbal support every 5 seconds*,
3) *in this last stage only oral instructions were given to the trainee*. The results of this survey showed that the 'most to Least' prompting technique was effective for the teaching of plain swimming skills.

Table 2

Stages of The Halliwick's Swimming Method

Phases	*Skills*	*Purpose*
Phase 1	Mental adjustment Disengagement	Adjustment to the water
Phase 2	Vertical rotation Lateral rotation Combined rotation	Rotations in the water
Phase 3	Up thrust Balance Turbulent gliding	Control of movement in the water
Phase 4	Simple progression Basic progression	Movement in the water

Source: Yilmaz, et al.(2010)

In the second survey (Yanardag et al., 2015) 3 children 6-year-old with ASD were evaluated. The aim of the survey was to find out if the MLP is an effective technique for the teaching of motor exploration skills in a pool for children with autism. The three levels of MLP were taught. None of the 3 participants had any experience or knowledge of the motor exploration skills prior to the study. The duration of the study was 10 weeks (3 sessions each week). All sessions were conducted with one to one approach (one trainer - one child). The process in the sessions included:
1) an oral message to attract the participant's attention
2) participant then was called to perform a skill
3) participants were allowed five seconds to initiate the skill
4) if the participant had the correct behavior, the outcome was marked with a plus (+)
5) if the participant had the wrong behavior, the outcome was marked with a minus (-).

After the evaluation process, the behavior of the participants was endorsed with a verbal praise for their cooperation. Then, the researcher used the controlling prompt for the face submersion skill.

Similarly, a controlling prompt was used for retrieving an object from the bottom of the pool. According to the results this technique was effective since the kids not only increased their swimming skills but also retained these successful skills in the following stages, as well.

Table 3

Description for target skills.	
Skills	
Blow bubbles	1. Participant fills air to his mouth 2. Participant's lips touches to the water 3. Participant blows bubbles by exhaling air in mouth
Face submersion	1. Participant close his mouth 2. Participant bends his head forward 3. Participant immerses entirely his face and head into water
Retrieves object from bottom of pool	1. Participant immerses his body into water 2. Participant picks object from bottom of pool 3. Participant moves to the surface of the water with object

Source: Yanardag, et al.(2015)

One of the most effective programs for aquatic exercise is CI-MAT. CI-MAT is a therapeutic swimming program, multi systemic aquatic therapy on gross motor and social skills, which was used by (Caputo et al., 2018) and by (Battaglia et al., 2019) and produced significant statistical results for the people in the autism spectrum.

In the first survey (Caputo et al., 2018) a CI-MAT effectiveness check was conducted. 26 children participated in the study (17 boys and 9 girls). There were two groups of children with ASD, 13 participants were in the CI-MAT group (2 girls) and 13 in the check group (7 girls). The experimental group followed the CI-MAT program, while the check group did not receive any aquatic treatment. Both groups were receiving the standard of care treatment consisting of a combination of conventional language therapy and psychomotricity. The treatment lasted 10 months.

In this specific survey some of the tools used were: The Childhood Autism Rating Scale (CARS, Schopler et al., 1993) which is an evaluation form of autistic symptomatology. The Vineland Adaptive Behavior Scales (VABS Sparrow et al 1984), which evaluates adaptive behavior through interviews. The CARS and VABS were used twice at the beginning and at the end of the programs. As for the practical aquatic stage they used theHumphries Assessment of Aquatic Readiness (HAAR- Humphries, 2008) which is a checklist evaluating aquatic skills and is divided into five stages.

Mental adjustment

I. Introduction to water environment

II. rotations

III. balance and control

IV. independent movement in water

And the CI-MAT program which comprises of three stages:
I. Emotional Adaptation
II. Swimming Adaptation
III. Social Integration

Table 4

Brief description of the CI-MAT programme: training phases, goals, developmental domains, and examples of activities

CI-MAT phase	Goal	Developmental domain	Activities
I: Emotional Adaptation	Building a functional attachment relationship between the expert and the child	Emotional and social	The child moves from and comes back to the expert playing in the water, for instance throwing a ball away and retrieving it, blowing bubbles or straddling on the aquatic noodle
II: Swimming Adaptation	Teaching swimming skills	Motor	Aquatic exercises precisely adapted for individuals with disabilities, as floating supine and prone unassisted, and gliding from the side to side of pool with bent leg kick and basic arm movements independently
III: Social Integration	Facilitating group integration, cooperation and social interaction	Social	Group-swimming activities and games, such as noodle kicking, jumping and floating, and hula-hoop swimming

Source: Caputo et al. (2018)

The first two stages are delivered once a week in an "one to one" analogy from one expert to one kid, while the third stage is conducted twice a week in small groups (children 4 to 6) with one to three analogy (one expert for three kids) and in all stages every session lasted 45 minutes.
Finally, the Language Therapy and Psychomotricity were applied both to the control group and to the experimental group. Conventional language therapy is a language training based on a systematic, step-by step teaching technique using prompts and useful reinforcements. Psychomotricity is a treatment approach; it relies on the idea that learning motor skills is the basis to develop more complex and effective behavioral skills. The results of the survey indicate that CI-MAT is an effective program as regards the various functional and behavioral disorders of children with ASD.
And the following survey (Battaglia et al., 2019) was aiming to study the results of a CI-MAT program in mobility, item control skills and in contact and interactive behaviors of teenagers with ASD. The teenage participants were 3 (two boys and one girl). The design of the survey followed a multiple method approach for the evaluation:
1) mental age tests, age of participants, the anthropometric and gross motor skills were estimated with the Correspondences and Functions Evaluation test (both at the beginning of the study and at its end)
2) parental evaluations of the adaptive behavior of participants
3) video recording of the behavior of the participants in the pool (both at the beginning of the study and at its end).

The evaluation of the adaptive behavior was conducted with the Vineland Adaptive Behavior Scales (VABS), which was given to the parents of the participants in order to evaluate the adaptive evolution of their children. Also, an evaluation of social behavior has been conducted.
An observation program was created and adjusted by Veruti (2001) to provide an interaction count and the contact of the participants. Furthermore, there was an evaluation of the gross motor skills using The Test of Gross Motor Development (TGMD). This is a criterion referenced test, composed of two subtests aimed at measuring two skill sets: 7 locomotion and 5 object control skills.
Next, the CI-MAT program followed for 12 weeks, where the kids were video recorded during the session (50 minutes). The results showed that the applied aquatic skills training program was effective for the strengthening of object and machinery control skills of people with ASD. This goes hand in hand with previous studies which indicated that aquatic exercises improve various aspects of gross motor adequacy. However, the survey (Ennis,2011) followed another program aiming at improving the motor and social function. 11 kids participated in the survey ranging from 3 to 9 years old, but only 6 of them completed the aquatic program which lasted 10 weeks. The program that children had to follow is shown on table 5. The evaluation of the children was done both prior to the program as well as afterwards.

Table 5 Program Outline

Program Activities	Approximate Time
Warm up: enter water, walk in pool	5–10 minutes
Swimming, pull with hoop	5 minutes
Bubbles, respiratory activities, pulling through water, sequence breathing	5 minutes
Ball toss between kids or other reciprocal activity	5 minutes
Floating, pulling through water	5 minutes
Jumping, push-off activities	5 minutes
Mat/balance activities, ball toss through hoop	5 minutes
Diving underwater if able	5 minutes
Free play	10 minutes

Source: Ennis (2011)

Tools that were used for this specific survey were: 1) WOTA based on Halliwick, investigating aquatic adjustment and 2) thePeds-QL which was given to parents in order to evaluate quality of life. Results showed that all children increased their scores after the end of the lessons as regards their motor function, while their social scores were not satisfactory.

Finally, the survey of Yupan (2010) was aiming to determine the effectiveness of a swimming program for water exercise swimming program (WESP) and for the aquatic skills and social behavior. 16 boys with ASD participated in the study. All boys completed the 21 week program (10 weeks of WESP, 10 weeks check and 1 week of transition). Each participant was examined three times, one time at the beginning, one time at the end of the first 10-week period and one time after the end of another 10 weeks. WESP was divided into four categories:

A) Floor activities
B) One-to-two instruction
C) Group activities
D) Cool down activities.

The design of WESP was based on the Humphries of Aquatic Readiness directive (HAAR-Humphries, 2008) which was evolved on the foundations of Halliwick method (Martin, 1981).

Table 6. Water exercise swimming program

Category	*Length (min)*	*Content*	*Goal*
A. Floor activities	20	Visual schedules and social activities Limbs and truck exercise Splashes water with hand or foot	Communication and social interaction Warm-up Water adjustment
B. One-to-two instruction	40	Water orientation skills Breathing skills Floating skills Stroke skills	Water orientation and swimming skills
C. Group activities	20	Cooperative games/ activities (e.g., noodle kick/jump/float, hula-hoop swimming)	Social interaction Aquatic and motor skill development
D. Cool down activities	10	Look at the primary instructor, listen, raise hand if there is a question or want to answer a question	Review, reward, social interaction, clean-up, and help with transition

Source: Chien- Yu Pan (2010)

The results of the above surveys indicate that there are improvements in the aquatic skills (WESP) and generally of the functional disorders of ASD children. All swimming schedules seem to improve the aquatic safety skills ($p=0.0002$). Furthermore, CI-MAT and SPARK are effective programs for evolving motor skills and social behavior (WESP) ($p<0.05$).

The "Most to Least" technique is one of the most effective methods of increasing the swimming skills of children with autism.
However, the survey (Alaniz, et al., 2017) has shown that the chosen treatments did not have a significant impact on the gross motor skills, on speed, coordination and strength of children with autism a=0.05.
Also, the survey (Mohamed, 2017) has shown that the statistical analysis: No significant differences between the pretests and posttests for the experimental group in Childhood Autism Rating Scale (CARS). Finally, the survey (Pinkham, Haley &O'Neil, 2011) has shown that the statistical analysis no significant between-group changes were found.
Although there were considerable increases in the diagnosis of disorders in the autism spectrum (ASD) in the last twenty years, children with ASD still continue not to have many opportunities for physical exercise. Swimming lessons have been proposed as an ideal type of physical activity for that population, but surveys investigating the experience of instructors dealing with those swimmers, are still quite limited yet.

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Section 3: Neuromuscular Diseases and Aquatic Therapy
(Nikodelis Thomas, Ntampakis Ioannis)

Neuromuscular diseases (NMD) are those that, either because of hereditary, or as acquired diseases, are related to the peripheral neuromuscular system. NMD are affecting anterior horn cells, peripheral nerves, neuromuscular junctions, and muscle (McDonald, 2002). NMD are characterized as a heterogeneous group of disorders, including moto-neuron diseases, disorders of peripheral nerves, neuromuscular transmission disorders and muscle diseases. The development of the diseases differs significantly. Deficits can vary from muscle weakness, sensory loss, pain, fatigue, and autonomic dysfunction in many combinations. As a result they generate impairments of musculoskeletal and sensory functions, limitations in activities, and restrictions in participation (Cup et al, 2007).

Reduced physical activity is a major result of progressive neuromuscular diseases. NMD involve both quality of life and health outcomes. There is an interaction between the disease pathophysiology, the impairment itself, the functional limitation, the disability, and societal limitation that determines physical activity in the community (McDonald, 2002). Inactivity and obesity at patients with NMD are associated with high risk for developing or deteriorating comorbid conditions such as high blood pressure, high blood cholesterol, diabetes, heart disease, strokes, coronary artery disease, obesity, osteoporosis, anxiety, and depression (McDonald, 2002; Stan, 2013).

Many people with NMD wish to be involved with physical activity, but various obstacles minimize their ability to attain the advised level of exercise. Land based exercise is particularly difficult for patients with NMD, due to a significant lack of appropriate places, of transport means and of individualized exercise. Moreover, land based exercise needs substantial effort to move against gravity leading to higher risk of falls and other injuries(McDonald, 2002; Stan, 2013). On the contrary, the aquatic environment offers for all people, even those with mobility limitations, a safe and effective alternative for exercise (McDonald, 2002; Stan, 2013).Aquatic exercise has low- impact on joints that load forces when comparing with land-based exercise. However, at the same time, water provides resistance that may be used to increase muscle strength and aerobic capacity. Additionally, participation in aquatic exercise programs optimizes socialization skills and mental health (Atamturk & Atamturk, 2018).

Although, aquatic therapy can really benefit children or adults with NMD, there is a clear gap on the existing literature. The existing gap can be explained by the heterogeneity of NMD, the different kind of therapy protocols that are used (physiotherapy, occupational therapy, exercise therapy, aquatic therapy etc) and the individualized programs that do not encourage research designs.

For all the aforementioned reasons, McDonald (2002) delivered a systematic review on exercise therapy and other types of physical therapies for patients with neuromuscular diseases (NMD). He reviewed studies that included the following criteria:
1) any of the following types of NMD: moto-neuron diseases, disorders of the motor nerve roots or peripheral nerves, neuromuscular transmission disorders, or muscle diseases and 2) all types of exercise therapy and other physical therapy modalities.
Outcome measures had to be at the level of body functions, activities, or participation according to the definitions of the International Classification of Functioning, Disability and Health (ICF). Conclusion of this systematic literature review revealed that the available evidence is limited, but relevant for clinicians.
The most important finding was that any kind of future research relating to physical activity in neuromuscular disease will have to focus on the development of scientifically based recommendations. These recommendations have to emphasize to optimal exercise approaches and include both disease-specific and general guidelines (McDonald, 2002).
Hydukovich and Schmitz (2008) reviewed studies in order to determine the effects of aquatic intervention on children suffering from neuromuscular disorders compared to that of traditional land based physical and occupational therapy services.
Results showed that cerebral palsy was the main neuromuscular disorder that was especially associated with aquatic therapy. Aquatic therapy intended to increase the range of motion, the functional mobility, normal movement patterns, and feelings of self-esteem.
Majority of the studies concluded that aquatic therapy is a really feasible and effective intervention method. So, the use of aquatic therapy as an occupation-based treatment method is beneficial for children suffering from neuromuscular disorders for a variety of reasons. Utmost importance is the enhancement of the range of motion, an ability that is essential for engaging in basic daily living activities, and the improvement of self-esteem. (Hydukovich& Schmitz, 2008)
Aquatic exercise is among the most common physical activity programs for children with neuromuscular and neurodevelopmental disorders. However, the outcome actions that therapists should take under consideration when working with these specific populations have not been widely studied.
For that purpose, Rodríguez, Lima Florencio, Arias-Buría, Lambeck, Fernández-de-las-Peñas& Palacios-Ceña (2019) designed a content analysis in order to identify and compare the main theme of outcome measures used in aquatic physiotherapy for children. For that reason they used the International Classification of Functioning Disability and Health (ICF) as a framework. A content comparison of identified outcome measures was linked to the ICF and content-related metrics were used to analyze them. Four outcome measures were identified:
1) Humphries' Assessment of Aquatic Readiness (HAAR), 2) Adapted Aquatics Screening Test, 3) The Water Orientation Test Alyn 1and 2 (WOTA 1,2), and 4) Swimming With Independent Measurement (SWIM).

These four evaluation tests contained a total of 116 meaningful concepts and were linked to 35 ICF 2nd level categories. The use of the ICF as a guide to compare the contents of aquatic skill measures revealed homogeneity with respect to the theoretical foundation; however, it also showed some differences in the content analysis.
In assessment is also vital to define how functional and how time consuming are these measures. In all four of the aforementioned tools the average application time was 15–30 min, but for the selection of each tool, one must consider the prior training needed to use them. In this case, the WOTA 1 and 2 were the only ones that defined this concept as a prerequisite, ensuring its correct application.

Each tool that was included in this current study evaluated mainly aquatic skills that were based on Halliwick concept, and were subdivided according to whether the outcomes focused more on therapy or on aspects related to the learning of swimming. The overview provided by this study showed the simplicity of the aquatic assessment as a unidimensional field of evaluation. (Rodríguez et al., 2019).
The effectiveness and safety of a group aquatic aerobic exercise program on cardiorespiratory endurance for children with disabilities was examined by Fragala-Pinkham, Haley and O'Neil (2008). Sixteen children (11 males, 5 females) aging between 6 to 11 years old (mean age 9y 7mo [SD 1y 4mo]) participated in this twice-per-week program for 14 weeks. Participants were diagnosed with autism spectrum disorder, myelomeningocele, cerebral palsy, or other developmental disability. More than half of the children walked independently without aids. Children swam laps and participated in relay races and games with a focus of maintaining a defined target heart rate zone. The strengthening module consisted of exercises using bar bells, aquatic noodles and water resistance. Measurements of the study were: half-mile walk / run, isometric muscle strength, timed floor to stand 3-meter test, and motor skills. Complaints of pain or injury were systematically collected.

Results of the study showed significant improvements in the half-mile walk / run, but not for strength or motor skills. The mean program attendance was 80%, and no injury was reported. Fragala-Pinkham, et al. (2008) concluded that aquatic exercise in groups may be a fun alternative to land-based exercise programs for improving cardiorespiratory endurance in children with disabilities and can provide a safe and beneficial alternative on low-impact exercise.
Aleksandrović et al. (2010) designed a research in order to show the effects of an adapted swimming program on children with neuromuscular impairments. Main goal of this adaptive swimming program is to teach participants how to move in water with safety and independence. Participants were 7 children with neuromuscular impairments (cerebral palsy, paresis, spina bifida) that were between 5 to 13 years old and they were recruited regardless of their swimming knowledge. The WOTA2 test was used because it is a multi- item test that measures swimming knowledge of people with disabilities. WOTA2 has 27 particles i.e. questions that are being answered by evaluation grading from 0 to 3:

1. General adjustment to the water
2. Blowing bubbles through the mouth
3. Blowing bubbles through the nose
4. Blowing bubbles with head immersed
5. Rhythmically exhaling while moving
6. Exhalation alternately, nose & mouth
7. Entering the water
8. Getting out of the water
9. Sitting in the water
10. Moving along the pool side rail using hands
11. Walking across the pool
12. Jumping forward
13. General adjustment to the water
14. Blowing bubbles through the mouth
15. Jumping and ducking in & out
16. Change position from standing to back floating
17. Static back float for 5s
18. Change position from back floating to standing
19. Prone gliding from wall to therapist
20. Change position from prone floating to standing
21. Right Longitudinal Rotation
22. Left Longitudinal Rotation
23. Combined rotation
24. Diving
25. Simple progression on the back
26. Freestyle
27. Backstroke

Researchers, also, tried to determine the level of orientation in the water by applying basic statistical parameters at initial and final measuring (t- test for dependent samples). The intervention program lasted for 8 weeks and its frequency was two 45 min. sessions per week. Each intervention session was designed in an individualized manner–one (instructor) on one (participant).

Additional prerequisites were adapted according to other participants' characteristics (e.g. age and type of disability). Finally, the whole intervention program was designed according to principles of Halliwick method, hydro-therapy and non-swimmers training for healthy population.

Results of this study revealed statistically relevant differences between the measuring in favor of the final one. Participants at the beginning of the program demonstrated inability to control their balance and their movements but at the end of the intervention all participants were significantly improved in four of the tasks (tasks 15- 18). Although there is no significant statistical difference between initial and final measuring in other balance and movement control tasks, there is an obvious improvement due to the program (Aleksandrović et al., 2010).

Stan (2013), also, designed a case study that examined how a competent aquatic therapy program can improve range of motion, strength of the arms and legs and reduce spasticity in people with multiple sclerosis. Side effect of aquatic therapy program is the enhancement of socializing. The intervention program was based on techniques like Watsu sessions, Bad Ragaz Method, Halliwick Concept, Task-Type Training Approach and patient education. Participant was an old woman of 75 years old. The program's duration was 7 weeks, with once a week frequency. Each session lasted 30 minutes.

Results of the study revealed that although multiple sclerosis is a degenerative and progressive disease, the role of therapeutic aquatic program helped the participant not only maintain a satisfactory level of continuous independent life, but also feel more confident with her abilities. The aquatic program can also support full range of motion and offers buoyancy supported environment. Another extremely important result of the study was the significant improvement in the level of fatigue, a crucial factor that is related to a potential positive effect on functional abilities. Aquatic rehabilitation effectively improves impairment and disability oriented problems for people with limitations from neuromuscular occurrence.

Aquatic exercise programs for people with neuromuscular disorders should be designed and supervised by therapists with expertise in recognizing the lack of control of functional movement commonly encountered by patients with those clinical conditions and identifying strategies to overcome them (Stan, 2013).

Atamturk and Atamturk (2018) also designed a case study. Purpose of their study was to define how participation in physical activities can actually benefit individuals with disabilities in terms of quality of life. The participant was one boy who has Duchenne Muscular Dystrophy (DMD). The current study reported: 1) the swimming pool adjustments according to the individual needs, 2) the increase of quality of services in order to support individual needs, and 3) the benefits from the aquatic program. Conclusion of this study revealed that aquatic therapy had beneficial effects on the participant with DMD in terms of socialization, relaxation, quality of life and self-perception (Atamturk & Atamturk, 2018).

Finally, Plevnik, Retar and Zupan (2014) evaluated a hydrotherapy program, the swimming abilities of participants and the importance of different rehabilitation techniques included in the rehabilitation program. For that purpose 236 people who attended the National Rehabilitation Program for people with muscular dystrophy, filled out a questionnaire with 32 variables.

Results of the study showed that hydrotherapy and swimming are important parts of rehabilitation for people with muscular dystrophy, especially when they are compared to individual exercises in physiotherapy and therapeutic massage. Participants that couldn't swim under water or couldn't dive, evaluate hydrotherapy as a really useful part of the rehabilitation procedure. Adaptation to water and learning effective self-rescuing techniques represent an important part of hydrotherapy programs for people with neuromuscular disorders (Plevnik et al., 2014).

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Section 4: Cerebral Palsy

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Cerebral palsy is a non-progressive chronic disorder (Eisenberg et al., 2009, p. 79) that occurs in children and involves disorganization of posture and movement (Marinescu et al., 2011, p. 5). Cerebral palsy is due to damage to the immature brain, which may appear before, during or after birth (WHO, 1993, p. 1; Eisenberg et al., 2009, p. 79; Dimitrijevic et al., 2012, p. 167) and affects patients for the rest of their lives (WHO, 1993, p. 1).

Pădure (2011, p. 59) states that cerebral palsy is a clinical complex of non-progressive postural and motor abnormalities caused by injuries to the developing central nervous system, where motor impairment appears before, during or soon after birth.

It occurs is about 2 per 1,000 normal births in Europe (Haberfehlner et al., 2020, p. 18). Statistics by the World Health Organization ([WHO], 1993, p. 1) mentions an incidence of 1 case in 300 births at world level, while Colver, Fairhurst and Pharoah (2013, p. 1240) indicate a number of 2 to 3.5 cases in 1,000 births.

Cerebral palsy is a disease described since ancient times by Hyppocrates (Panteliadis, Panteliadis, & Vassilyadi, 2013, p. 285), but more detailed research has been initiated only in the 19th century (Little, 1862, cited by Colver, Fairhurst, & Pharoah, 2013, p. 1240).

Overall clinical aspects

Brain injury causes impaired movement associated with abnormal reflexes, stiffness of the limbs and torso, abnormal posture, involuntary movements, unsafe gait or a combination of these. There are cases where injuries affect other brain areas, which may cause visual, hearing, communication or learning difficulties (WHO, 1993, p. 1). Manifestations of brain disease appear in childhood or the preschool period, and treatment should be stated immediately.

Colver, Fairhurst and Pharoah (2013, p. 1240), as well as Gunel et al., (2014, pp. 32-34) talk about the symptoms and signs of cerebral palsy:

1.spasticity – muscles are stiff (Pădure, 2011, p. 25), and movements are performed slowly and awkwardly. The body has an abnormal position, and traveling from one side to another is difficult, which is why only a small number of movements can be performed (WHO, 1993, p. 4). The effort is increased when the person tries to move quickly.

Subjects may also have joint pain and problems. With age, deformities can appear.

McIntyre et al. (2011, p. 115) estimate that 85% to 91% of affected people have this form of cerebral palsy.

According to Pădure (2011, p. 56), the severity of motor impairment may cause paresis (moderate disorder) or plegia (severe disorder), which affects either the whole body (tetraplegia) or only the lower limbs (paraplegia). McIntyre et al. (2011, p. 115) believe that tetraplegia occurs in 26% of people diagnosed with cerebral palsy, hemiplegia, in 38% of cases, and dysplasia, in 36% of patients;

2.dyskinesia – manifests as athetosis or dystonia, the incidence ranging from 4% to 7% (McIntyre et al., 2011, p. 115). The patient with athetosis is hypotonic and hyperkinetic, and the one with dystonia is hypokinetic (McIntyre et al., 2011, p. 115).
Movements are involuntary, slow (Pădure, 2011, p. 57), disordered (tense movements or wriggling hands, arms, legs or face). These movements are more obvious when the subject is agitated and diminished when the subject is calm.
Muscles receive different commends from the brain (from stiff to floppy) (McIntyre et al., 2011, p. 115), which results in an abnormal position in which body balance is altered. If the face is affected, the subject eats and talks with difficulty, their words being hard to understand (Pădure, 2011, p. 57). Deformities are estimated to be less common;
3.ataxia – characterized by a wider support base in the standing position, frequent falls (especially on the back), possible eye abnormalities, hypotonia (Pădure, 2011 p. 58). Movements are unsteady and shaky (McIntyre et al., 2011, p. 115). Problems occur when the person tries to stand, walk or do something with their hands (WHO, 1993, p. 4). Balance is a major problem that makes it difficult for the subject to learn and maintain the standing position, but also to walk. The incidence is 4% to 6% (McIntyre et al., 2011, p. 115);

Damage to systems and organs

Associated impairments and functional limitations that can be encountered in cerebral palsy are:

- muscle contracture – involves the shortening of muscle tissues due to severe muscle stiffness. Contracture can inhibit bone growth causing their deformity, as well as joint deformity, dislocation or partial dislocation (Dimitrijevic et al., 2012, p. 167). Muscle contracture can also be associated with coordination problems that cause complications related to swallowing (Hinchcliffe, 2007, p. 201) or affecting the visual or hearing system. Other times, muscles are floppy (Pădure, 2011, p. 66). McIntyre et al. (2011, p. 115) state that hypotonia is rarely encountered (2%) and should not be considered a form of cerebral palsy.
- Poor nutrition – some subjects have difficulty eating due to problems with their neck, tongue and lip muscles (WHO, 1993, p. 7). Given that feeding is difficult, many subjects with cerebral palsy have poor nutritional status. This can have a negative effect on bone growth and muscle development. Hemiplegic subjects have thinner and shorter arm and leg on the affected side compared to other unaffected segments (WHO, 1993, p. 7). Some subjects (8%) may need a tube to feed properly (McIntyre et al., 2011, p. 116; WHO, 1993, p. 7; Pădure, 2011, p. 80). At the same time, due to impaired muscles of the neck, tongue and lips, some subjects with cerebral palsy have speech and language disorders (Pădure, 2011, p. 59). The World Health Organization (1993, p. 7) considers that learning to chew has positive effects on speech. Also, the subject gets to speak, but sometimes their words are not very clear to be understood by others (WHO, 1993, p. 7).

- Damaged mental state – not all subjects with cerebral palsy have mental impairment (Pădure, 2011, p. 59). The WHO (1993, p. 7), McIntyre et al. (2011, p. 116), Colver, Fairhurst and Pharoah (2013, p. 1240) estimate that almost half of the subjects diagnosed with cerebral palsy have intellectual difficulties, and 20% to 30% have severe intellectual disabilities (McIntyre et al., 2011, p. 116). Gunel et al. (2014, p. 37) mention that over 65% of those with cerebral palsy show signs that indicate the existence of an intellectual disability. The WHO (1993, p. 7) has also found that the speech difficulties of some subjects lead certain specialists to associate them with mental retardation, although their IQs are normal. Children with athetoid cerebral palsy can have average or even good intellectual ability. At mental level, seizures and epilepsy may also be present (Pădure, 2011, p. 59; Colver, Fairhurst, & Pharoah, 2013, p. 1240). They cause new brain damage and decrease learning skills (WHO, 1993, p. 8). Colver, Fairhurst and Pharoah (2013, p. 1243) talk about several psychological difficulties that occur in children with cerebral palsy compared to normal children. In adults with cerebral palsy, signs of fatigue frequently appear in 23% of cases (McIntyre et al., 2011, p. 116), pain is present in 70% of those diagnosed with this disease (McIntyre et al., 2011, p. 116), but they also show symptoms of depression. Pavao et al. (2013, p. 1372) indicate attention disorders, and Gunel et al. (2014, p. 39) mention sleep problems.
- Damage to the musculoskeletal system – muscle contracture causes additional pressure on the joints, which results in foot deformities (Dimitrijevic et al., 2012, p. 167), hip dislocation (8%) (McIntyre et al., 2011, p. 116), etc. Due to spasticity, body posture is also affected (Davlet'yarova, Korshunov, & Kapilevich, 2015, p. 2). McIntyre et al. (2011, p. 116) estimate that between 27% and 25% of subjects with cerebral palsy have impaired gait. Davlet'yarova, Korshunov and Kapilevich (2015, p. 2) observed abnormal mobility at the hip, shoulder and elbow joints in subjects with cerebral palsy – dysplasia. Also, poor nutrition, lack of movement and specific drug consumption cause a decrease in bone density (osteopenia and osteoporosis) (Jorgic et al., 2012, p. 49; Colver, Fairhurst, & Pharoah, 2013, p. 1244), which increases the risk of fracture. Colver, Fairhurst and Pharoah (2013, p. 1240) believe that some subjects may have physical deficiencies such as scoliosis.
- Damage to the respiratory or cardiovascular system (Ballington & Naidoo, 2018, p. 2).
- Visual impairment – identified by Colver, Fairhurst and Pharoah (2013, p. 1240, 1244), Idwan et al. (2011, p. 1). McIntyre et al. (2011, p. 116) estimate that 5% to 12% of subjects with cerebral palsy have severe visual problems, and 30% have mild to moderate visual problems. The most common problem is strabismus (WHO, 1993, p. 7; Pădure, 2011, p. 59), but myopia and hypermetropia may also occur (Colver, Fairhurst, & Pharoah, 2013, p. 1244), as well as nystagmus (Gunel et al., 2014, p. 38). With age, strabismus may disappear (WHO, 1993, p. 7). If the problem persists, the child should be seen by a physician. Blindness may also occur (Pădure, 2011, p. 59).

- Hearing impairment (Hinchcliffe, 2007, p. 16; Colver, Fairhurst, & Pharoah, 2013, p. 1244) – causes difficulties in learning speech, which develops later. McIntyre et al. (2011, p. 116) estimate that hearing problems occur in more than 10% of subjects with cerebral palsy, and 2% may have problems with both ears;
- damage to analyzers (Hinchcliffe, 2007, p. 16; McIntyre et al., 2011, p. 115; Colver, Fairhurst, & Pharoah, 2013, p. 1240) – has a direct influence on the sensations and perceptions of the subject with cerebral palsy;
- predisposition to skin and kidney infections (Colver, Fairhurst, & Pharoah, 2013, p. 1244), but not only.

Motor aspects

Colver, Fairhurst and Pharoah (2013, p. 1245) believe that motor intervention, along with occupational therapy and speech therapy are essential and should be performed every day (Shariat et al., 2014, p. 3).

The effects of motor retardation are multiple (WHO, 1993, p. 11). The picture of motor disability is sometimes clear from the first days of life, but there are cases where it becomes obvious only around the age of 3-4 years (Marinescu et al., 2011, p. 5). Motor assessment is done using development charts that are identical to those for the normal child (WHO, 1993, p. 11). It should also be accompanied by the assessment of subject's communication and behavior.

Following the assessment, it can be seen that some people can walk, while others cannot. At the same time, spasticity prevents some subjects from performing all movements they can do at certain joints. Range of motion is also affected.

Motor assessment should underpin the intervention program, which must be adapted to the real needs of the subject (Pavao et al., 2013, p. 1372). The program must be applied early, correctly and tenaciously (Pădure, 2011, p. 84) and must cover both the education of fitness components and the learning, consolidation and/or improvement of basic or applied utilitarian motor skills. It is also recommended to start motor stimulation as soon as some disorders or delays of a few weeks are observed in the motor development of the child (Marinescu et al., 2011, p. 5).

Marinescu et al. (2011, p. 5) and Gunel et al. (2014, p. 46) believe that the chance of recovery is better if the intervention program is initiated at an early age, because motor centers are not yet developed (myelination occurs up to the age of 7), and plasticity of the brain allows stimulating its functions, given that the subject is closer to the age at which motor acquisitions normally occur (Marinescu et al., 2011, p. 5).

It is important for the learned work and motor skills to be transferred into everyday activity because they can help the subject to become independent (WHO, 1993, p. 2).

Motor stimulation enables the subject with cerebral palsy to develop not only at this level but also emotionally, cognitively and socially (Davlet'yarova, Korshunov, & Kapilevich, 2015, p. 2) due to induced wellbeing (Doban, 2008, p. 11).

Motor stimulation can also be achieved with the help of technology (Idwan et al., 2011, p. 2; Chung-Sing & Yu-Lin, 2013, p. 185; Necula & Marcu, 2014, p. 150), which has developed a lot and has made its way into the recovery programs for subjects with cerebral palsy; however, it cannot replace physical exercise, the value of which has long been recognized and accepted.
Physical exercises used for the recovery of motor skills gets special features (Georgescu, 1999, p. 6) according to the type of cerebral palsy, age, gender, conditions associated with the main diagnosis, etc. Exercises included in the intervention program must simultaneously target several areas of development (Pădure, 2011, p. 78).
World Health Organization (WHO, 1993, p. 20), Hinchcliffe (2007, p. 88), Pădure (2011, p. 88), etc. have established a number of general recommendations (adapted and modified by us) that should be considered when a recovery program is applied to subjects with different types of cerebral palsy:

- encouraging the execution of movements as naturally as possible;
- encouraging the execution of movements with both arms and legs (Hinchcliffe, 2007, p. 182);
- monitoring the motor development phases of younger subjects (Hinchcliffe, 2007, p. 88);
- encouraging the subject to learn by doing, especially in the case of skills that can be transferred into daily activity (Pădure, 2011, p. 88): formation of skills regarding personal hygiene, nutrition, adaptation to daily living and social autonomy;
- correctly positioning the subject in lying, sitting, kneeling and standing stances (Hinchcliffe, 2007, pp. 89-94);
- permanently preventing the occurrence of other wrong attitudes or physical deficiencies.

At the same time, the WHO (1993, p. 20) set a series of goals pursued by the motor intervention program for each type of cerebral palsy:
1.the spastic subject:
-relaxation of stiff muscles;
-avoid movements leading to the occurrence of spasticity in the whole body;
-prevent the occurrence of physical deficiencies.

2.the athetotic subject:
-learn to hold on with hands to steady uncontrolled movements;
-if abnormal body positions come and go, also follow the goals for a spastic child.

3.the floppy subject:
-provide support in a good position;
-encourage movements so that the muscle becomes stronger.

4.the ataxic subject:
-improve balance in kneeling and standing positions, as well during gait;
-stand and walk steadily;
-control unsteadily shaky movements, especially of the hands.

Gait learning is a major objective in the recovery of the subject with cerebral palsy. This complex process (Pădure, 2011, p. 82) must begin with assessing the vertical position of the body, followed by an assessment of the ability to move and control all body segments (Marinescu et al., 2011, p. 5). Gait learning or retraining is based on providing the subject with as many information as possible from as many analyzers as possible to ensure a sense of security (Marinescu et al., 2011, p. 5). The moment when children manage to walk is perceived by them as a special moment (Marinescu et al., 2011, p. 5), because they experience a new sensation, that of independence, and their greatest desire is to participate in other children's play.

Given their inability to move freely, subjects with cerebral palsy have a low level of education for all fitness components (Van den Berg-Emons et al., 1998, p. 180; Jorgic et al., 2012, p. 49; Shariat et al., 2014, p. 1). According to Marinescu et al. (2011, p. 5), each means performed should be accompanied by an explanation (example: "I am doing this... because...", or "If this happens... I have to do like this...") so that subjects can perform them in their free time, outside the program carried out with a specialist.

It will be permanently considered that a program performed for the learning, consolidation and/ or improvement of motor skills (gait learning) also entails the education of fitness components (Dimitrijevic et al., 2012, p. 167) and conversely.

Coordination problems for different body segments are obvious in the subject with cerebral palsy and are due to stiff muscles. These problems do not allow performing fluent movements, and manual dexterity is affected (Colver, Fairhurst, & Pharoah, 2013, p. 1240). The coordination of muscles that ensure body posture is also impaired (Pavao et al., 2013, p. 1368) and affects the performance of daily living activities (work skills), but also individual adaptation to the environment.

Due to neurological deficit, balance is affected too (Dimitrijevic et al., 2012, p. 167). This impairment is also highlighted by daily living activities (Pavao et al., 2013, p. 1372). Marinescu et al. (2011, p. 5) believe that balance education should be done in parallel with gait learning; they state that preparing the subject to learn to maintain balance is the first step in the verticalization process and is a component that should be present in the intervention program until the sitting position can be automatically controlled.

The inability to move, associated with communication problems, causes the subject with cerebral palsy to be frustrated and nervous, to give up doing something or even refuse to try to do it again (WHO, 1993, p. 8). Therefore, the person(s) working with these subjects should be calm and help them understand what they have to do.

The intervention program should take into account that some subjects with cerebral palsy have sedentary lifestyles (Dimitrijevic et al., 2012, p. 172; Ballington & Naidoo, 2018, p. 2). Its duration should be individualized from 15-20 minutes (Pădure, 2011, p. 79) to 45 minutes (Van den Berg-Emons et al., 1998, p. 181; Rogers et al., 2008, p. 813) or 60 minutes (Marinescu et al., 2011, p. 5), with the possibility of performing it twice a day (Pădure, 2011, p. 79). Shariat et al. (2014, p. 3) believe that the program should be performed 3 times per week, Van den Berg-Emons et al. (1998, p. 181), 2 to 4 times a week, while Marinescu et al. (2011, p. 5) recommend repeating it 5 days per week. What is certain is that the exercise program must be performed over a long period of time (Dimitrijevic et al., 2012, p. 172) and has direct effects on the whole body.

In order to break the monotony of recovery lessons based on physical therapy, the practice of sports activities can also be introduced. Their role is to extend the effects induced by physical therapy and adapted physical education (Teodorescu & Bota, 2007, p. 4) with the help of motor skills specific to some sports disciplines. Obviously, the practice of means taken from different sports disciplines will pursue the same goals as those of physical therapy and adapted physical education but will also pursue goals specific to the sports branch chosen for practice.

Garcia et al. (2012, p. 143) state that the practice of sports activities is important for the health and quality of life of subjects with cerebral palsy. It allows them to discover their motor potential, to overcome barriers and preconceived ideas about performance, to promote social inclusion, to remove attitudes of discouragement and indifference, but also to develop their personality (WHO, 1993, p. 8).

Gradually, the practice of adapted sports moves from the recovery area and becomes a means of spending free time with family, friends or other subjects with the same health problems. At a higher level, adapted sports can also be practiced in the competitive form. Nowadays, there are many adapted disciplines that have changed their regulations (Bălan, 2018b, p. 10) in order to be practiced by subjects with different disabilities at local, regional, national or international levels (World Championships, Paralympic Games).

Social Aspects

Physical exercises practiced in different forms also have social valences (Georgescu, 1999, p. 20), besides the biological ones, which are best emphasized by contact with other individuals.

Socialization is a process that occurs over time and begins in the first months of life, when the baby comes into contact with parents and other close relatives who have to create a stable familial environment that stimulates the child to assimilate attitudes, values, patterns of behavior (Ivan, 2010, p. 105), but also symbols belonging to groups, society, their way of life (Negulescu, 2006, p. 8). Subsequently, the group with which the child socializes expands through contact with more distant relatives, parents' friends, etc.

This initial social contact continues with the attendance of different forms of education where subjects interact with people of the same age, with whom they begin to spend more and more time. Subjects with cerebral palsy should not be excluded from these social experiences but helped and encouraged to attend these institutions.

In recent years, there is a growing interest in sports activities practiced not only as part of recovery programs but also as relaxation, recreation and entertainment. In this context, adapted sports disciplines act in two directions (Dragnea et al., 2001, p. 3): socialization within motor actions and highlighting the socializing effects of motor activities. Ivan (2010, p. 105) also reveals two positive effects of adapted motor activities with an impact on strengthening the psyche, self-respect, self-identity, but also on harmonious physical development, maintaining health and well-being.

The interest of other social categories in the sports activity of subjects with disabilities has also increased, as evidenced by the growing number of spectators at competitions, the number of hours dedicated to broadcasting major competitions, the number of journalists present at competitions, but also the number of qualified specialists ready to meet the demands that arise during the training of subjects with disabilities.

Sports disciplines, as ways of practicing physical exercise, adapt to the specificities of subjects with cerebral palsy, creating an environment that facilitates and supports learning and social integration. The effects produced by the systematic practice of sport are complex, multidirectional.

Due to the easier social contact that occurs while practicing physical exercise, subjects with cerebral palsy can enjoy small motor successes together with other peers who have the same medical problems, their families, friends and other people they meet during motor activities. Thus, the barriers between them and the environment, between them and the attitude of others towards their limited capabilities to move (inability to use some body segments or doing uncontrolled movements), which restrict their access to community life, are diminished (Pădure, 2011, p. 85).

The motor issues of these subjects affect both their communication (WHO, 1993, p. 23; Colver, Fairhurst, & Pharoah, 2013, p. 1240) and way of behaving (Colver, Fairhurst, & Pharoah, 2013, p. 1240) in different situations.

Communication problems are rather felt by the adult (Colver, Fairhurst, & Pharoah, 2013, p. 1243), who has difficulty participating and engaging in social life, as well as managing interaction with the environment.

Hearing subjects communicate by words. Communication tools can be represented by voice or the expression of different feelings through crying, laughing, whimpering, body movements, facial expression, gestures, pointing with the eyes or fingers, writing or drawing (WHO, 1993, p. 23). McIntyre et al. (2011, p. 116) estimate that only 20% to 30% of those affected do not communicate at all. To communicate with them, some of the aforementioned tools or voice-generator technological devices can be used (McIntyre et al., 2011, p. 116).

Subjects with cerebral palsy also have problems with clearly uttering words because they have difficulty controlling the movements of the head, face, tongue and mouth. When others do not understand what they want to say, many subjects become frustrated and refuse to keep getting socially involved. However, Pădure (2011, p. 85) argues that it is important for such subjects to communicate in any way they can.

Particular aspects related to the practice of aquatic activities by people with cerebral palsy

Practicing various aquatic activities can be a good recovery alternative (Chrysagis et al., 2009, p. 23) for subjects with cerebral palsy, especially if they do not have much chance to move on land. This statement is also supported by Dimitrijevic et al. (2012, p. 168), Maniu (2015, p. 72), Chrysagis et al. (2009, p. 14), and many others, who appreciate the benefits of aquatic therapy consisting of low-impact exercises (Fragala-Pinkham, Haley, & O'Neil, 2008, p. 826).
The low impact of exercises performed in water is dues to the effects induced by Archimedes force that apparently reduces bodyweight. Bodyweight no longer presses on the joints, muscles relax and stretch, and body segments can be mobilized from functional, normal positions (Bălan, 2018, p. 17). The upthrust allows performing movements along the entire movement path (Dimitrijevic et al., 2012, p. 168), but also performing more difficult means than on land, which can be practiced for a longer period (Benelli, 2003, p. 57).
In the planning of aquatic lessons, several aspects must be considered and adapted to the specificity of activities performed in the pool:

- before starting the aquatic lessons, the subject's general motor skills must be assessed on land. Water activity, with SMART objectives, must be planned on the basis of this assessment. The proposed exercises, as well as the specific and non-specific aids used in the lessons should be recorded daily (Dimitrijevic et al., 2012, p. 170). After a certain period, another assessment must be performed. Depending on the gains achieved by the subject, the initial planning can be restructured and adjusted (Pădure, 2011, p. 78);
- the assessment must be objective and should be done by another person who does not know the learner (to increase objectivity). A good cognitive level indicated that the subject can be assessed. At the same time, the subject should be encouraged to communicate the perceived changes throughout learning, but also other aspects he or she wants to understand;
- ü in addition to the level of development of different motor skills, the planning of aquatic lessons must also consider the concrete needs of the subject (Pavao et al., 2013, p. 1372). In the case of older subjects, it would be good to also take into account their preferences for practicing specific aquatic activities;

- the number of lessons allocated to learning a motor skill differs from one subject to another. There must be a sufficient number of lessons to give the subject time to repeat that skill (WHO, 1993, p. 18);

  ü demonstration and manual guidance will be used to either make the subject understand what he or she has to do or correct the subject;
- training must include all specific work habits (shower before and after the lesson, tying the cord of the bathrobe, wiping with a towel, dressing, drying hair, etc.), which are consolidated through practice and can be transferred to everyday activities (WHO, 1993, p. 47):
- it will be taken into account that not all subjects have the same progress rate. This rate depends on the difficulty of the motor task, the degree of damage to the subject but also the other associated conditions, the availability of time, the material resources of the family, the availability of family members to escort the subject to the pool, etc.;
- if learning is difficult, simplified means should be performed;
- it is also important to collaborate with other specialists who work with the subject, to know their objectives over a given period, how the subject deals with the activity, the working method used by those specialists; the atmosphere created during the lesson must be agreeable so that the subject wants to come back to the pool;
- when communicating with the subject with cerebral palsy, simple words or short sentences will be used. It would be good if the words used were associated with the movement. The subject must be given time to respond (WHO, 1993, p. 18);
- if subjects have a level of development appropriate to their chronological age, it would be good to talk to them, to tell them about the objectives they have to achieve within a given period;
- the effort made by the subject during the lesson should be appreciated, and from time to time, the child should be rewarded (WHO, 1993, p. 18);
- direct contact with the subject's family is recommended (Hinchcliffe, 2007, p. 119), because its members know the subject best and can facilitate communication with him or her if communication problems are present;
- the subject's family must be informed about the progress made or any other positive or negative aspect that arises during the aquatic lesson.

Garcia (2012, p. 143) recommends practicing aquatic activities because they are beneficial to the whole body, even if the organs and systems work much more as soon as the body sinks into water. Dimitrijevic et al. (2012, p. 172) recommend 2 swimming lessons per week with a duration of 55 minutes each, at a water temperature of 27.7° C and a water depth of 70 to 180 cm.

Chrysagis et al. (2009, p. 16) talk about swimming lessons that last 50 minutes and are performed twice a week in a 25-m pool at a water temperature between 28° C and 31° C. These lessons are focused on the learning of swimming strokes (front crawl and backstroke) with the help of specific floatation aids.

Another opinion is that aquatic activities should last 45 minutes, but the weekly frequency of workouts is different: Maniu and Maniu (2014, p. 33), 2 lessons per week, Jorgic et al. (2012, p. 55), 3 lessons per week, and Roger et al. (2008. p. 812), 4 lessons per week. Dimitrijevic et al. (2012, p. 172) recommend for the aquatic lessons to use individualized work as the best training method because the teacher's attention is focused only on the working subject and thus can intervene immediately if a problem arises. It is important that water training, associated with other land-based therapies (Carayannopoulos, Han, & Burdenko, 2020, p. 25), becomes part of the daily schedule (WHO, 1993, p. 47; Hinchcliffe, 2007, p. 191).

Methods used in aquatic activities for the subject with cerebral palsy

Aquatic activities are the most widespread means of treating subjects with cerebral palsy (Tirosh et al., 2008, p. 224). Over time, specialists have sought to find methods that facilitate the learning of swimming by subjects with cerebral palsy, knowing that specific health problems make it difficult to learn movements in the water environment. The literature presents the following methods for the learning of swimming by subjects with cerebral palsy:

1. **The Halliwick Concept**

The Halliwick Concept is the most common method used for subjects with cerebral palsy to learn swimming. The Halliwick Concept (originally known as the Halliwic-Gresswell method, 2015, p. 27) has been constantly developing since 1949, when it was created by James McMillan (born in England). As a mechanics engineer, he has developed a method that facilitates the learning of swimming (Grosse, 2010, p. 200) by able-bodied people (Gresswell, 2015, p. 27; Maniu, 2015, p. 78), people with other health issues (obesity, high cardiovascular risk or other constraints – Maniu, 2015, pp. 72-73; stroke – Tripp & Krakow, 2014, p. 432), but especially people with various disabilities (Grosse, 2010, p. 200).

The Halliwick Method relies on the principles of hydrostatics and hydrodynamics, which are adapted to the motor behavior in water (Tirosh, Katz-Leurer, & Getz, 2008, p. 225). Its purpose is to ensure independence in water, safety in and in the proximity of water, pleasure during water activities (Grosse, 2010, p. 200), as well as physical and mental comfort in a non-specific human environment.

In the international literature, special attention is paid the Halliwick Concept, numerous studies highlighting the advantages of this method in learning to swim, but also the benefits of swimming for the health and wellbeing of those who practice it. Moreover, in 1994, the International Halliwick Association (IHA) was founded in order to promote and develop the Halliwick Method all over the world (Gresswell et al., 2010, p. 1). IHA has decided to replace the term "method" with the notion of concept because it has a broader meaning that allows specialists to apply Halliwick as appropriate, in different contexts (Gresswell et al., 2010, p. 1).

IHA argues that the Halliwick Concept involves a holistic approach to more knowledge related to water and body, teaching and learning, motivation, challenge, activities, games and music, dynamic groups, equal opportunities for the disabled and swimming, all of this based on the principles of hydrostatics, hydrodynamics, as well as physical therapy.

Within the Halliwick Concept, motor behavior in water means a series of motor actions or skills (Gross, 2010, p. 203) that result in getting used to the water and learning the fundamental technical elements. Referring to these actions, Gross (2010, pp. 203-205) talks about: entering and exiting the water, aquatic breathing, orientation in the pool (head out of the water), moving through water (by walking, running, jumping), moving forward into a prone float or backward into a supine float, rolling from supine to prone and continuing a full rotation back to the starting supine position, combining the two types of movements, maintaining the body under turbulent conditions (waves), floatation preceded by submersion.

The Halliwick Concept includes a 10-point program (Tirosh, Katz-Leurer, & Getz, 2008, pp. 225-226; Gresswell et al., 2010, pp. 2-10) through which subjects with cerebral palsy gradually learn the motor behavior specific to the aquatic environment, which will allow them at the end to move independently and safely in water using their arms and legs. Learning is approached logically and gradually and is based on aquatic games and activities (Garcia et al., 2012, p. 143).

Maniu (2015, p. 78) frames the 10 points into three stages: mental adaptation, balance control and movement. In contrast, Gunel et al. (2014, p. 55) divides the Halliwick Concept into four stages: adaptation to water, rotation, control of movement in water and movement in water. The whole approach is aimed at controlling posture while the subject learns to swim, namely learning balance in supine (stable position) and how to keep balance in an unstable position (Gunel et al., 2014, p. 55).

The 10 points of the Halliwick Concept are:

mental adjustment (Maniu, 2015, p. 79) – the subject often has difficulty maintaining the position of the body on the surface of the water, which causes feelings of insecurity and anxiety. Through demonstration and manual guidance provided by the teacher, the subject learns to respond to the laws governing the movement through water. To this, Gresswell (2015, p. 28) associates the idea that the subject should feel happy in water to learn effectively (and in a relaxed manner, we would add). We believe that mental training, which is done both on land (before entering the water) and in water, plays a very important role.

Garcia et al. (2012, p. 148) share the same view, recommending that the skills learned in water be repeated and consolidated on land. Gresswell (2015, p. 28) mentions that this point also includes the learning of aquatic breathing, which must be performed whenever the face comes into contact with the water or the body is floating (Gresswell, 2015, p. 28).

We think that learning this specific skill is a major point in the phase of adaptation to the water. Also, from our practical experience in working with other categories of subjects with disabilities, we can state that the learning of swimming-specific breathing should be accompanied by land-based exercises performed at home too, with the support of a family member. Tirosh, Katz-Leurer and Getz (2008, p. 226) and American Red Cross (2009, p. 170) consider that the subject with cerebral palsy is ready to learn the other skills specific to body control in water when mental adjustment and water adaptation have been achieved;

- **disengagement** (Maniu, 2015, p. 79) involves various activities through which the subject becomes independent in water, both physically and mentally. At this point, the subject learns not to lean with his or her foot on the bottom of the pool or to hold on to the side walls (Gresswell, 2015, p. 28). Gradually, the physical and verbal support given by the teacher is eliminated;
- **transversal rotation control (achieved around the transverse axis of the body)** – this movement allows the body to shift from a vertical position to a horizontal position on the surface of the water and conversely. The horizontal position can be prone or supine. The shift from the vertical position to prone can also occur when the subject is leaning to bubble the water (Gresswell, 2015, p. 28). From supine, the shift to the vertical position is done by looking towards the tiptoes, lifting the head above the water or reaching forward with the arms (Gresswell, 2015, p. 29). Gresswell (2015, p. 29) also indicates the occurrence of this rotation around the transverse axis when performing forward or backward simple rolls (in a more advanced learning stage, we add);
- **sagittal rotation control (achieved around the sagittal axis of the body)** – this movement is done with the subject upright in water moving laterally through the pool (Gresswell, 2015, p. 29). It can also be done with the subject upright bending his or her truck laterally (Maniu, 2015, p. 82) to reach the lying sideways position;
- **longitudinal rotation control (achieved around the longitudinal axis of the body)** – through this movement, the subject in supine rotates 90° to reach the lying sideways position or 180° to reach the prone position. Obviously, moving the body from one position to another can also be done with a 360° rotation. The initial position can be prone or supine, and the direction of rotation is to the right or to the left;
- **combined rotation control** – this movement controls the combinations of shifts or rotations described above. Maniu (2015, p. 82) mentions that vertical rotation can be associated with lateral rotation or sagittal rotation can be associated lateral rotation. Gresswell (2015, p. 29) says that it is particularly useful for the subject who does not yet have good control of breathing or has lost balance and reached a supine position with his or her face in water. The subject, through successive rotational movements, reaches the supine position where breathing is much easier. In a more advanced phase, these combined movements help the subject to perform the turns used in front crawl and backstroke (Gresswell, 2015, p. 30);

- **upthrust** – this is the property of water that helps the subject to float (Gresswell et al., 2010, p. 5). The subject learns that this force supports him or her on water without sinking. Learning to float is recommended to be associated with learning to sink. When sinking, the upthrust brings the subject to the surface and keeps him or her there. Gresswell (2015, p. 30) calls this effect mental inversion. We believe that the subject should stay still and relaxed. If the subject is agitated and tries to come to the surface as soon as possible or tries to rise much above the surface of the water, the upthrust will decrease, and the swimmer's body will sink. Gresswell (2015, p. 30) highlights at this point the importance of the first item, namely mental adjustment (Maniu, 2015, p. 79);
- **balance in stillness** – involves maintaining the position of the body on water without performing additional movements of the arms or legs. Static balance must be maintained in both still water and turbulent water (with waves). Gresswell (2015, p. 30) states that there are many positions that the body can adopt to float on water, but the best is the one in which the subject can breathe easily – the supine position;
- **turbulent gliding** (Maniu, 2015, p. 82) – involves moving the body through water in the floating position without physical contact between the subject and the teacher (Gresswell et al., 2010, p. 5). The body movement is due to the waves produced in water by the movements made by the teacher, who is a few steps behind the subject and walks through water or stands still and creates waves beneath the subject's shoulders. No propulsive movement with the arms or legs is needed, but the subject must control his or her balance on water so as not to move to another position (Gresswell, 2015, p. 30);
- **Simple progression and basic swimming stroke** – involve moving the body through water with the help of arm strokes or leg kicks. The subject can perform the leg movements with his or her arms close to the body. To this means, the subject can later add the hand movement near the thighs or can perform a simultaneous arm movement through water (the arms rise to the shoulder level and go down near the thighs).

Gross (2010, pp. 200-202) mentions that there several key issues to be considered when applying the Halliwick Concept:

- individualization: the teacher works with a single subject. This makes the Halliwick Method extremely safe. The teacher is permanently focused on the subject and intervenes whenever needed;
- floatation aids are not used: aquatic activities practiced within the Halliwick Concept are performed without floatation aids (swimming ring, swimming belt, inflatable noodle). Only the support and manual guidance are used, the teacher being able to determine exactly how much to support and/or assist the subject at a given time;
- head position control is an important point because maintaining the head correctly has a decisive role in learning all swimming-specific skills. Therefore, within this concept, the teacher does not touch the subject's head at all, but only guides by verbal command. Thus, the importance of visual control increases, the teacher telling the subject how to hold his or her head and where to keep his or her gaze fixed for the head position to be correct;

- breathing control involves that the subject learns specific breathing from the very moment of entering the water. At the beginning, the subject's face is above the water so as correct breathing is learned. Then, the face will be at water level (the water is blown to form a wave), and after that the face will sink and the water will be bubbled. Learning specific breathing lowers fear and gives confidence;
- water depth: during the activities carried out within the Halliwick Concept, the shoulders of both the subject and the teacher must remain underwater. This position can be achieved by sinking the head in a pool whose depth allows standing upright or by bending the lower limbs. Keeping the shoulders underwater maintains body temperature, facilitates breathing, improves cardiovascular function (Grosse, 2010, p. 2002), etc.

Tripp and Krakow (2014, p. 432) recommend aquatic therapy lessons using the Halliwick Concept 3 times per week for 45 minutes, while Ballington and Naidoo (2018, p. 3), 2 lessons per week for 30 minutes.
Depending on the degree of impairment, the time needed to complete the 10 points of the Halliwick Concept is different. Grosse (2010, p. 206) talks about a very long period in the case of people with physical or multiple disabilities.

2.**Watsu Method**

This method combines stretching with joint mobilization and dance (Gunel et al., 2014, p. 55). The subject's movement is passive (Carayannopoulos, Han, & Burdenko, 2020, p. 21) and is constantly supported by the therapist. Movements are performed only in supine and aim to decrease muscle tension and reduce stress.

3. **Bad Ragaz Method**

Passive and active movements are performed (Carayannopoulos, Han, & Burdenko, 2020, p. 21), but also active movements against resistance applied by the therapist (Gunel et al., 2014, p. 55). Throughout the program, the subject holds the supine position and is supported by floatation aids (Gunel et al., 2014, p. 55). Proprioceptive neuromuscular facilitation techniques are also used to activate hypotonic muscles (Gunel et al., 2014, p. 55).

Advantages of aquatic activities for subjects with cerebral palsy

The benefits of practicing various aquatic activities for subjects with cerebral palsy are reflected in their physical, social and intellectual levels (Gross, 2010, p. 206). Numerous specialists have highlighted them, for instance:

- Tripp and Krakow (2014, p. 432) - positive effects on gait and educating some forms of mobility.
- Hou, Wan and Li (2010, p. 870) - significant effectiveness on gait in school-age subjects with cerebral palsy.
- Grosse (2010, p. 200) - perceptual-motor development because subjects benefit from a lot of sensory information. Learning motor skills also contributes to the education of fitness components as part of the overall learning process (Grosse, 2010, p. 206): strength, cardiovascular endurance, increased fine motor control because muscle control increases and body fat decreases. At the same time, participation in group aquatic therapy lessons requires cooperation and interaction with others, but also allows subjects to enhance their functional movements in the aquatic environment.
- Chrysagis et al. (2009, p. 14) - increase in gross motor function for subjects with spastic dysplasia. They showed an increase in flexion and abduction at the lower limb. Moreover, participation in aquatic programs has contributed to self-image acceptance, improved self-esteem and functional independence.
- Dimitrijevic et al. (2012, p. 172) - the benefits induced by the water exercise program appear much sooner than the benefits induced by the land-based program. Also, participation in aquatic therapy increases the quality of life, improves life habits and increase socialization. In a second study, Dimitrijevic et al. (2012, p. 750) talk about improved gross motor functioning, decreased spasticity and increased cardiorespiratory endurance.
- Hutzler et al. (1998, p. 179) - improvements in respiratory functions.
- Garcia et al. (2012, p. 146) - improved self-esteem, knowledge of the body and its movement abilities, muscle relaxation, reduced stress, facilitated movement compared to land-based movement (also confirmed by Carayannopoulos, Han & Burdenko, 2020, p. 21), socialization and social integration, confidence and self-control.
- Jorgic et al. (2012, p. 55) - education of fitness components, especially cardiovascular endurance, strength and coordination (Jorgic et al., 2012, p. 49) as a result of learning motor skills specific to swimming strokes. Direct effects are also reflected in body stability on the ground and the improvement of social behavior, self-confidence and self-awareness (Jorgic et al., 2012, p. 50).

- Maniu (2015, p. 83) - increased mobility and stability of the spine, as well as increased stability of the pelvis and lower limbs; education of balance and abdominal strength.
- Van den Berg-Emons et al. (1998, p. 181) - practicing disciplines based on aerobic effort, among which swimming, leads to maintaining body composition, developing strength and aerobic power.
- Carayannopoulos, Han and Burdenko (2020, p. 23) - improved alignment and stability of the body on land during gait due to maintaining the body upright throughout the aquatic program. The authors claim that the effects of this program are much better if they are associated with a land-based exercise program.
- Gunel et al. (2014, p. 55) - psychological benefits can be noted.
- Ballington and Naidoo (2018, p. 7) - improved basic motor skills, especially gait; they recommend long-term aquatic activities so that their effects are visible.
- Fatorehchy, Hosseini and Rassafiani (2019, p. L55) - improved gait and balance education.
- Gueeita-Rodriguez et al. (2018, 513) - improved quality of life and social inclusion, as well as increased resistance to disease.

We should not forget the other advantages offered by the aquatic environment to recovery programs (Tirosh, Katz-Leurer, & Getz, 2008, pp. 224-225):

- the upthrust (Archimedes' force) supports the movement in water, which is difficult to perform on land due to gravitational force. It facilitates the movement if performed upwards and makes it difficult if performed downwards (Plas & Hagron, 2001, p. 174; Jorgic et al., 2012, p. 49);
- hydrostatic pressure improves breathing and increases cardiac output. If associated with warm water, it decreases pain (Bălan, 2018, p. 18);
- warm water temperature (32°-33° C) facilitates muscle relaxation, reduces muscle tone, contributes to increasing surface circulation, stimulates thermoregulation and metabolism (Bălan, 2018, p. 21);
- viscosity can be beneficial to the development of muscle strength. It also contributes to better perception of limb position due to sensory stimulation, to educating balance (Gunel et al., 2014, p. 54; Bălan, 2018, p. 18) and strength (Gunel et al., 2014, p. 54);
- the permanent maintenance of the body position, considered as a direct result of the relationship between contrasting forces of the center of gravity and the center of buoyancy, improves body balance.

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Section 5: Physical injury rehabilitation
(Nikodelis Thomas, Ntampakis Ioannis)

Physical therapy often includes exercise therapy to improve muscle function (strength and endurance) and aerobic capacity to prevent or reduce secondary problems such as pain and fatigue.

Many people can benefit from creative water workouts. Patients don't have to lose muscle tone and skill while recovering from injury and. aquatic therapy provides an alternative form of exercise.

Aquatic therapy has been used in different populations including for people with rheumatic disease, fibromyalgia, Parkinson disease, multiple sclerosis, cerebral palsy, and also spinal cord injuries. The aquatic environment makes it easier for people with muscular skeletal injuries to move their limbs and execute perform motor skills that are not possible on dry land. (Cup et al., 2007, Iucksch et al., 2013, Wong et al., 2009, Munguia et al., 2009)

Aquatic therapy is preferable also for injuries such as lower back pain, amputees and fractures of the upper and lower limbs that usually cause muscle atrophy especially after submission. The cause of this situation may be a car accident, or a drop fall from a height. This could be more difficult for elderly people who have increased osteoporosis (Vivas et al., 2011, Broach et al., 2003, Kelly et al., 2005).

For that reason it is preferred to use aquatic therapy to this kind of injuries so that we can activate the muscles around the suffering area, without having to burden the joints or cause pain to the patients. (Kesiktas et al., 2004)

A method used for this kind of injuries is “The Bad Ragaz Ring Method” (BRRM). The BRRM is an active, one to one aquatic physical therapy concept. The therapist provides the resisting fix points to the patients. The technique requires high skill and accuracy on the part of the therapists. Therefore, the therapist must have specialized knowledge of the concept and must be able to apply a refined gripping technique. Both are of utmost importance for the success of the method. (Harrison, 1982)

The BRRM is a strengthening and mobilizing resistive exercise - model based on the principles of Proprioceptive Neuromuscular Facilitation techniques (PNF). This method is addressed to all population groups in any situation or condition. It is not recommended for acute and painful conditions and in cases of increased muscle tone.

To provide BRRM the first that is needed is a well-informed therapist, who acts on the one hand as an immovable point, while the patient moves forward or moves away from him and on the other hand as an immovable point that can also move. The therapist by using special handles pushes the patient’s body, who is trying to stay steel performing isometric contractions.

Every session is about 15-20 minutes. The majority of the exercises are done from supine position, except for some exercises for the cord and the arms that are made from prone position. There are 3 main movement patterns that can be used:

1.Upper limbs
2.Hips or lower limbs
3.Cord

BRRM is not simply a matter of working against the resistance of water and adding a fixed point to a patient floating in supine position with buoyancy rings and then asking for active movements. The patient must be evaluated with an emphasis on determining the intervention needs. As a result the therapist chooses the adequate patterns and parameters. Physiological parameters differ depending upon the therapeutic goal such as increasing mobility endurance or strength. The amount of resistance is carefully graded in terms of timing and intensity. The patient must be educated about the procedure and when necessary, mental adjustments (Halliwick Concept) is advisable to precede BRRM. This mental preparation is an important component of the BRRM treatment program. When the patient is uncomfortable in a supine position or has difficulty with breath control, equilibrium reactions and/or stiffness it will interfere with treatment.
Equipment required:

- Heated pool, 33-36 °C, depth 1-1.2m
- 3 inner tubes, different sizes for neck, pelvis, and legs

The exercise program of the BRRM requires floatation buoyancy aids that provide patients safety and stabilization in the water. These floating aids also slow down the rotation of the body in the pool. The neck and hips are supported by rings preferably filled with air, and depending on the exercise, a third ring may support one or both ankles.

Exercises are progressed benefiting from the water hydrodynamic forces. The faster the movement the greater the drag which is created by water because of the turbulent flow. This drag increases in a squared function to the velocity of the patient. This principle results in a self-regulation of resistance, depending on the abilities of the patient.

The resistance exercises thus adapt to the capabilities of the patient. Resistance equipment such as hand paddles can be used to increase resistance. It is better not to focus directly on the affected area particularly in patients who are weak or who have chronic pain. If performing properly, beginning the exercise in distal body parts produces irradiation to the affected areas. (Lehman, 1970)
A progression of exercise can be accomplished as follows:

1.Move through increasing range of motion.
2.Change hand holds from proximal to distal.
3.Increase the speed of motion
4.Change the body shape to lengthen the level.
5.Increase techniques like combination of isotonic or repeated contractions.
6.Increase resistance by using hand paddles or other resistive equipment.
7.Apply less floatation to the rings (patient lies deeper in the water)
8.Change the frontal surface area.

Another method that is used for this population group is the method of Watsu. “Watsu” is the combination of the words “water” and “shiatsu”. It makes changes in physical, emotional and spiritual level. This method began in 1980 and its initial use was for relaxation, but now it has evolved and it is also used for cure purposes. (Dull, 2004)
Warm water is the ideal medium to free the body. If you are floated in someone’s arms in the water who follows the rhythm of your breath and lifts you up when you breath in, it’s warmth penetrating, and wipes away the tension in your body. Therefore, you drift into deeper and deeper levels of relaxation as your body is stretched freer and freer.
Watsu affects us on all levels of our being: on the emotional, psychological, and spiritual, as well as on the physical one. Many of its effects on the emotional are due to the trust Watsu engenders. Each person is different and what somebody gets out of Watsu differs. With some patients the simplest rocking and stretching is the only feasible thing, while with others both the trainer and the person with disability are moving into ever new positions that flow one into the next with a Zen spontaneity. The true Zen of Watsu comes when someone feels the same freedom with whomever he or she floats with around the pool. The freedom the patients experiences with the therapist is totally present in their body at every moment. The way they move through a sequence can be a spontaneous one like their breath.
What is important for this technique is to be in water with lower temperature than 37°C. The therapist has to be familiar with the patient so that he will be able to achieve relaxation to the maximum level. It is good to know the limits of the patient and never push him to any extreme. It is very important for your patient to feel safe.

So it is necessary to support the patient's head and avoid any sudden moves or drops. As the muscles become more relaxed, the danger of hyperextension is increased. Nose and mouth should always be out of the water. Also, while the person lies back the therapist must make sure that he or she is in a comfortable position and has no pain to the lumbar, probably caused by the sinking of the legs.
Everybody acts differently in the water, so it is important for the therapist to learn about the patient's body and its reaction in the water.
The best way to get this done is by the water breath dance, by touching the patient to the area over the shoulder and around the neck to see how the body behaves in single moves. Some patterns that are used in Watsu method are:

·Water breath dance
·Slow offering
·One leg offering
·Two leg offering
·Accordion
·Rotating Accordion
·Near Leg Rotation
·Far Leg Rotation
·Arm breath squeeze
·Swing
·Push Around
·Arm Leg Rock
·Overgrip rotatiom

To conclude Watsu is applied passively by the therapist and combines elements of massage, pressure therapy and mobilization therapy. Its main purpose is to get the patients more comfortable with their body and drive them to a condition that they have no pain at all.

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Section 6: Down syndrome

(Valeria Balan, Associate Professor PhD, Ana Maria Mujea, Lecturer PhD - Both authors have equally contributed to this chapter and should be considered as main authors)

Literature Review

Studies by the World Health Organization (WHO) have shown that over 1 billion people at global level have some form of disability. The same organization estimates that the number of people with a certain form of disability will double by 2050. In the European Union, approximately 2.5% (104,000) of the 5.2 million births reported each year have congenital anomalies; of these congenital anomalies, about 8% are represented by Down syndrome (European Commission, 2019). According to WHO, the incidence of Down syndrome is 1 in 1,000/1,100 births, Hwang et al. (2019, p. 2473) mention 1 in 700 births, and Păcurar et al. (2018, p. 208), 1 in 650/800 births.Sierra Romero et al. (2014, p. 293) specify that trisomy 21 or Down syndrome is the most known human chromosomal. This condition was first described by John Langdon Down (Sierra Romero et al., 2014, p. 293).

In about 93% of cases, it appears due to the presence of a third copy of chromosome 21 (Lauteslager, 2005, p. 21). This extrachromosome (trisomy) causes a genetic imbalance and induces metabolic disorders at the cellular level, which are responsible for the characteristic features of this condition. This aspect has led Korenber et al. (1994, p. 4997) to state that people with Down syndrome may represent the prototype for the study of human aneuploidy.

Mureşan and Coman (2011, p. 5) believe that trisomy 21 involves the association of three groups of changes: highly specific dysmorphia, growth retardation and mental retardation. Mental disability is constant and can range from severe to moderate or mild retardation. The intelligence quotient (IQ), which is between 20 and 85 (Mureşan & Coman, 2011, p. 10), leads to slow progress in all areas of development. Down syndrome “significantly impacts the lives of those with the disorder as well as their families and the society in which they live, causing both human suffering and economic burden” (Salehi et al., 2009, p. 627).

Functional Aspects

Trisomy 21 is associated with “a wide variety of phenotypes” (Korenber et al., 1994, p. 4998) that were presented by many specialists. Some present them in specialized books (Lakatos & Moldovan, 2000; Lauteslager, 2005; Teodorescu et al., 2007; Marcu et al., 2007); Mureşan & Coman, 2011; Chilnicean, 2010; Curat, 2015, etc.), others associate them in scientific research focused on people with Down syndrome.

In this context, we will make a unitary presentation of the characteristic somatic aspects:

- short and stocky body; below-normal average height. Children with Down syndrome grow at a slower rate and remain shorter than children without disabilities (Mureşan & Coman, 2011);
- thick hands and legs;

- small head with epicanthal folds (Bull, 2011, p. 393);
- Mongoloid-specific face; flat face / flat nasal bridge (Bull, 2011, p. 393);
- small mouth (Bull, 2011, p. 393), relatively large tongue over a protruded lower lip (Mureşan & Coman, 2011, p. 20);
- small, round, dysplastic ears; small auditory canal (Chilniceanu, 2010, p. 32);
- upward slanted eyes; wide-distanced eyes. Bull (2011, p. 393) also mentions downward sloping eyelids;
- short and thick neck;
- funnel-shaped and/or flattened chest;
- small and wide palm; some people have a single groove in the center of the palm (Bull, 2011, p. 393); short fifth finger with clinodactyly (Bull, 2011, p. 393);
- larger-than-normal gap between the big toe and the second toe (Bull, 2011, p. 393);
- low muscle tone (Leonard, 2002, p. 164; Fidler, 2005, p. 98; Bull, 2011, p. 396; Malak et al., 2013, p. 803; Matute-Llorente et al., 2013, p. 1152; Paul et al., 2019, p. 1; Boer &DeBeer, 2019, p. 1453) that can lead to:

a) feeding problems or digestive problems (constipation), especially in children (Mureşan & Coman, 2011, p. 21);

b) wrong postures with direct effects on body position (dorsal-lumbar kyphosis);

c) difficulties in maintaining the standing position. Lauteslager (2005, p. 47) thinks that maintaining the standing position with legs apart could be a compensatory mechanism caused by inefficient balance or insufficient activation of agonist and antagonist muscles around the ankle;

- joint hyperlaxity. Lakatos and Moldovan (2000, p. 18) believe that the highest hyperlaxity occurs at the elbow and knee. Special attention should also be paid to the atlantoaxial instability that has a high incidence in people with Down syndrome, namely 10% to 20% according to Morton et al. (1995, p. 115) and 15% according to Dedlow et al. (2013, p. 633). Of these confirmed cases, only 18% have symptoms (Morton et al., 1995, p. 115) that can manifest as torticollis and various signs of spinal cord compression;
- fragile joints due to delayed ossification (Mureşan & Coman, 2011, p. 25). With ageing, osteoporosis may occur as a result of reduced bone mass development (Marques-Aleixo et al., 2013, p. 71). Its occurrence is also associated with improper nutrition and lack of movement (Asonitou et al., 2018, p. 322);
- sensory and orthopedic abnormalities (Bittles et al., 2006, p. 222);
- tendency towards overweight and mildtomoderate obesity (Acharya, 2011, p. 30; Matute-Llorente et al., 2013, p. 1151; Paul et al., 2019, p. 1; Boer &DeBeer, 2019, p. 1453). Savucu (2010, p. 1292) mentions that the metabolic syndrome “has been frequently associated with an alteration in lipid profile. Diabetes mellitus also falls within the area of metabolic disorders

(Malak et al., 2013, p. 803; Asonitou et al., 2018, p. 322; Paul et al., 2019, p. 1). Obviously, the tendency towards overweight and obesity affects the body mass index (Asonitou et al., 2018, p. 322; Marques-Aleixo, 2013, p. 71);
- mental retardation (Malak et al., 2013, p. 803), which can be mild (IQ between 50 and 70), moderate (IQ between 35 and 50) or occasionally severe (IQ between 20 and 35) (Bull, 2011, p. 393). Acharya (2011, p. 30) shows that, in most people with Down syndrome, mental retardation is not profound, but "mild to moderate". This results in a slow development of intelligence, attention, verbal communication, learning, memory and performing motor skills (Malak, et al., 2013, p. 803).

Damage to systems and organs

The literature reveals a series of functional features/manifestations of Down syndrome associated with other conditions; obviously, not all of them in the same person. The presence of a larger or smaller number of functional manifestations (associated or not with various conditions) depends on the set of chromosomes (Mureşan & Coman, 2011, p. 9) with which the person is born. Salehi et al. (2009, p. 627) share the same opinion and mention that the trisomy affects more than 300 genes, which is associated with several manifestations that are also found in the functional plane. The various conditions may not appear from birth, but later in life.
The literature mentions the following functional problems associated with Down syndrome:
- heart defects (Bittles et al., 2006, p. 222; Salehi et al., 2009, p. 627; Bull, 2011, p. 396) and heart disease (Paul et al., 2019, p. 1). They are commonly encountered and negatively influence adaptation to effort, which is unsatisfactory (Makhov et al., 2018, p. 131);
- immunological disorders (Korenber et al., 1994, p. 4997; Bittles et al., 2006, p. 222). The increased risk of leukemia is most often mentioned (Korenber et al., 1994, p. 4997; Salehi et al., 2009, p. 627; Bull, 2011, p. 396);
- visual problems – refractive errors (Bull, 2011, p. 396), strabismus, eyeball anomalies, cataract (Bull, 2011, p. 396);
- hearing problems (Bull, 2011, p. 396; Păcurar et al., 2018, p. 209) – hypoacusis or even deafness;
- problems related to tooth appearance, growth and health (Kalyoncu, Giray, & Tanboga, 2018, p. 1368; Păcurar et al., 2018, p. 209);
- endocrine conditions (Korenber et al., 1994, p. 4997; Bittles et al., 2006, p. 222), but especially thyroid problems (Salehi et al., 2009, p. 627; Bull, 2011, p. 396; Păcurar et al., 2018, p. 209);
- respiratory conditions (Bittles et al., 2006, p. 222; Paul et al., 2019, p. 1);
- attention disorders (Asonitou et al., 2018, p. 322);
- depression, as well as dementia similar to Alzheimer's (Korenber et al., 1994, p. 4997; Hodapp et al., 2019, p. 569), whose onset may occur with ageing (Acharya, 2011, p. 30);
- digestive disorders (Bittles et al., 2006, p. 222; Salehi et al., 2009, p. 627);
- tissue dysmorphism (Malak et al., 2013, p. 803).

Ashworth et al. (2013, p. 1572) have demonstrated that people with Down syndrome display "greatest sleep disruption, with frequent and longer night wakings, as well as restlessness" and have identified that they develop "symptoms of sleep-disordered breathing and a range of other problems including grinding teeth, bedtime resistance and sleep anxiety". On the other hand, Bresling et al. (2011, p. 1092) have highlighted that the sleep anxiety problem diminishes throughout the developmental period, while all the other problems related to sleep apnea persist during the same period or worsen with aging (Acharya, 2011, p. 30).

Bull & Committee on Genetics (2011, p. 394) made a statistic that points out the proportion / incidence of different medical problems in people with Down syndrome (Table 1).

Table 1. Common medical problems in Down syndrome

Conditions	**%**
Hearing problems	75
Vision problems	60
Cataracts	15
Refractive errors	50
Obstructive sleep apnea	50-75
Otitis media	50-70
Congenital heart disease	40-50
Hypodontia and delayed dental eruption	23
Gastrointestinal atresia	12
Thyroid disease	4-18
Seizures	1-13
Hematologic problems Anemia	3
Iron deficiency	10
Transient myeloproliferative disorder	10
Leukemia	1
Celiac disease	5
Atlantoaxial instability	1-2
Autism	1
Hirschsprung disease	1

Source: Bull & Committee on Genetics, (2011, p. 394)

Another study by Lanzoni et al. (2019, p. 5) mentions the association of Down syndrome with a series of physical and intellectual disabilities, non-cardiac abnormalities (Table 2).

Table 2. Down syndrome cases with abnormalities in at least one system

System	% of live birth and fetal death cases
Congenital heart defects	43.6 %
Digestive	7.0 %
Limbs	3.3 %
Urinary	1.9 %
Nervous	0.9 %
Eye	1.6 %
Genital	0.5 %
Ear, face, neck	1.2 %
Oro-facial clefts	0.4 %
Respiratory	1.2%
Abdominal wall defects	0.3 %

Source: Lanzoni et al. (2019, p. 5)

Motor Aspects

Mental delay is also associated with a motor impairment that is equal to the mental impairment (Teodorescu et al., 2007, p.143), or motor skills are much more impaired than mental skills (Lauteslager, 2005, p.22). The motor delay was observed by Malak et al. (2013, p. 803) from the first years of life when there is a delay in achieving the independent sitting position (14 months instead of 6 months), crawling (12 to 18 months instead of 8 months) and walking (24 to 74 months instead of 10 to 15 months). The same authors (Malak et al., 2013, p. 803) believe that gross motor skills are achieved at an average age that is sometimes twice the mean age of typically developing children. Moreover, the motor delay is also inharmonic (Malak et al., 2013, p. 803). Matute-Llorente et al. (2013, p. 1153), Paul et al. (2019, p. 1) think that children and adolescents with Down syndrome are less active compared to other categories of people with mental retardation. Besides, Bota (2016, p. 12) points out that girls should be paid more attention because they are less active than boys, so that their skill development can reach the levels of both thedisability-specific benchmarks and chronological age. Regarding age, Matute-Llorente et al. (2013, p. 1154) have shown that adolescents with Down syndrome are more sedentary than children with the same syndrome.

All these issues result in very poor motor skills and “cause retarded psychomotor development and problems with learning” (Malak et al., 2015, p. 1905). Motor skill achievements do not progress automatically (Mureşan & Coman, 2011, p.22), but should be constantly stimulated from the outside within the educational process, but especially within and by the family. This stimulation must begin in childhood and continue throughout life.

What is certain is that any motor improvement entails intellectual development (Malak et al., 2013, p. 806), functional development (Terblanche & Boer, 2013, p. 826; Bota, 2016, p. 12) and social development (Bota, 2016, p. 12).

People with Down syndrome show low levels for all fitness components (Matute-Llorente et al., 2013, p. 1154). Savucu (2010, p. 1293) has reached the conclusion that people with Down syndrome have "low levels of peak VO2, consistent with low levels of cardiovascularfitness", which is below the values recorded by other categories of population with mental retardation. Low endurance levels were also found by Matute-Llorente et al. (2013, p. 1152), Asonitou et al. (2018, p. 322), Paul et al. (2019, p. 1), Boer and DeBeer (2019, p. 1453), etc.

The literature highlights other psychomotor problems of people with Down syndrome:
- balance disorders (Meneghetti et al., 2009, p. 231; Malak et al., 2013, p. 803). Dysfunction at this level causes problems related tothe development of motor skills (Malak et al., 2015, p. 1909). Regarding balance, Malak et al. (2013, p. 803) claim that these problems "are due to inadequate co-contraction caused by muscle weakness, mental retardation, dysfunction in sensory integration processes, cartilage hypoplasia and improper bone density".
- coordination disorders – fine coordination, eye-hand coordination, coordination of body segments during the execution of different motor actions. Malak et al. (2013, p. 805) believe that low coordination levels are also responsible for the difficulties that arise in the execution of motor skills, but also for the way in which they follow one after another. In the opinion of the same specialists, these aspects result from the hypoplasia of corpus callosum and the cerebellum. At the same time, coordination requires attention and concentration (Malak et al., 2013, p. 805), which are important cognitive issues; for this reason, people with mild mental retardation can better perform coordination tasks compared to people suffering from moderate or severe retardation. Besides, Savucu (2010, p. 1292) states that poor coordination, associated to "slow reaction time and overall greater movement variability", is also responsible for the "difficulties in many activities of daily living and physical work capacity".
- Unstructured body schema (no differentiation between the left hand and the right hand). Poor cognitive abilities, intellectual and psychomotor immaturity, quality of information processes, all of this leads to disruption in the development of body schema for people of with Down syndrome (Bălan & Mitrache, 2016, p. 365).
- low muscle strength (Matute-Llorente et al., 2013, p. 1152; Asonitou et al., 2018, p. 322; Paul et al., 2019, p. 1);
- Perceptual disorders (Lauteslager, 2005, p.24).

Obviously, all these issues have an influence on the motor learning ability of people with Down syndrome. Moreover, motor learning difficulties are also related to the intelligence quotient (Gilderthorp, Burns, & Jones, 2017, p. 285).

Marcu et al. (2001) state that people with Down syndrome whose intelligence quotient is immediately below normal (60 to 70) can learn motor skills specific to any sport. An IQ below 60 indicate greater difficulty in learning and performing sports activities, which requires the modification and adaptation of the means specific to different sports disciplines. However, in addition to the IQ, the choice of motor activities to be practiced by people with Down syndrome must consider their functional capabilities and preferred sports disciplines.

The important thing is to integrate movement therapy into the daily intervention program of people with Down syndrome (Fragala-Pinkham, O'Neil, & Haley, 2010, p. 162; Malak et al., 2013, p. 805; Matute-Llorente et al., 2013, p. 1154; Asonitou et al., 2018, p. 331; Makhov et al., 2018, p. 131). This should not be done at random but must last for 60 minutes and be of moderate intensity (Matute-Llorente et al., 2013, p. 1154) or high intensity (Fragala-Pinkham, O'Neil, & Haley, 2010, p. 162). Another point of view belongs to Kerstiens and Greem (2015, p. 199), who recommend practicing exercises that burn at least 2000kcal per week. These calories should be burned within at least 3 to 7 days of aerobic exercise, of which 3 to 4 days should include moderate to intense exercise (exercise intensity: 40% to 80% of VO2) (Kerstiens & Greem, 2015, p. 199).
It is certain that performing a regular movement program has beneficial effects on all fitness components whose level improves (Asonitou et al., 2018, p. 331; Paul et al., 2019, p. 4). The effectiveness of the 60 minutes is reflected in the reduction of diseases associated with this syndrome: osteoporosis, metabolic syndrome, etc.

Special attention should be paid to the education of balance because it plays an important role both at rest and in motion (Bălan, Cernea, & Georgescu, 2016, p. 315). Impaired balance is highlighted by the large support base (Lauteslager, 2005, p. 47) with which these people keep their standing position for fear of going downstairs or upstairs without holding on to the railing or without the support of another person (Bălan, Cernea, & Georgescu, 2015, p. 261). Moreover, lack of balance is also revealed by: late walking age (3 or 4 years), frequent falls while running, difficulty and fear of learning to ride a bike and difficulty to stop the support wheels, fear or even panic to stand alone on an oscillating surface.

This last problem seems to be specific to people with Down syndrome as opposed to other participant s with mental retardation (Bălan, Cernea, & Georgescu 2015, p. 264). Early balance education positively influences the gait of people with Down syndrome (Bandong, Madriaga, & Gorgon, 2015, p. 39), but also their ability to change the directions of travel without the occurrence of accidents, with direct effects on the quality of movement (Malak, et al., 2015, p. 1908). Specialists recommend adapted motor activities (Fragala-Pinkham, O'Neil, & Haley, 2010, p. 163) as being the most beneficial for people with Down syndrome, who are provided the opportunity to experience new and unique situations that help them gain some degree of autonomy.

The way in which different motor skills are learned is largely dependent on the individual. There are periods when the gains occur very quickly, when the pace is quite close to normal (Mureşan & Coman, 2011, p.27). They alternate with periods of stagnation or even periods of obvious regression. It is true that constant external stimulation leads to gain on all levels until old age, but practice is an essential condition to preserve these acquisitions. It is important for the motor skills to be properly acquired in technical terms, regardless of the age of the learner (Bălan, 2015, p. 46).

Malak et al. (2015, p. 1909), Bota (2016, p. 12) and Alesi et al. (2018, p. 2) emphasize locomotor skills (walking, running, jumping) because they are a key factor in determining the levels of physical activity, physical fitness and body composition. This statement is reinforced by Winders (1997) and Wieczorek (2008), who demonstrate in their studies that the running-related aspects, which are problematic in people with Down syndrome, are determined by speed, trunk rotation and flight phase. Moreover, Popescu (2016, pp. 7-8) claims that building practical motor skills has always been an objective of utmost importance for people with disabilities and not only.

Throughout the motor intervention, consideration should be given to the fact that some people with Down syndrome have difficulty passing from one movement to another, while others cannot perform simple movements or cannot perform simple movements with easiness, but can perform very complex movements, with a high degree of technicality. According to the recommendations of Malak et al. (2013, p. 805), the intervention plan should simultaneously consider several areas of development. For this, the above-mentioned specialists recommend that the motor function and balance be assessed in order to plan the appropriate physical therapy.

At the beginning of learning, successful attempts are rare and technically incorrect. Gradually, people with Down syndrome manage to learn the skills concerned and currently use them, according to their needs and the circumstances (Mureşan & Coman, 2011, p.28). It is very important for the external stimulation to arouse their curiosity by bringing new elements that lead them to repeat, to wish to practice the learned skills.

Poor working memory in people with Down syndrome is strongly related to their learning difficulties (Lakatos & Moldovan, 2000, p.25). Studies by Leonard et al. (2002, p. 164) have shown that older people with Down syndrome have better working memory. However, regardless of age, they must persevere even though they do not have this tendency (especially children) (Rondal & Perera, 2006, p. 185).

Another important issue, with direct repercussions on motor learning abilities, is the high prevalence of overweight and obesity among people with Down syndrome (Matute-Llorente et al., 2013, 1151). It is worth bearing in mind that people with Down syndrome mostly learn by imitation (Bota, 2016, p. 11) because their cognitive phenotype is characterized by“strengths in visual memory, visual-motor integration and visual imitation” (Gómez et al., 2020, p. 40). For this reason, their participation, communication and integration into activity alongside other people with or without disabilities influence and facilitate learning. Even when integrated into an entity where they have the opportunity to exercise, people with Down syndrome still need help because, in their case, learning is done with small steps (Malak, 2015, p. 1907) and is based on the acquired motor behavior and the experience gained during previous phases (Lauteslager, 2005, p.15). Thus, motor behavior is built in successive stages, and forgetting is limited.

Social Aspects

The socialization of children with Down syndrome begins in the family, around the mother and other relatives (primary socialization) (Negulescu, 2006, p. 5) who must create a firm and stable family environment and an affective and stimulating climate for them (Mureşan & Coman, 2011, p. 88). It is important to know that children with Down syndrome develop close relationships with parents and siblings compared to intellectually disabled children with other etiologies (Gomez et al., 2020, p. 40), which involves less stressful situations for these families.
The presence of facial characteristics specific to the Down syndrome phenotype makes this disability visible, which can affect interpersonal relationships and contribute to promoting the idea of isolation (Betancor et al, 2016, p. 316; Gomez et al., 2020, p. 40). This should not happen, and families caring for children/people with Down syndrome should be encouraged to integrate themselves and integrate them into society.
Primary integration is continued in schools and daycare centers (secondary socialization) (Negulescu, 2006, p. 5), where people with Down syndrome must acquire relationship skills. According to Buzalic and Buzalic (2000), the social inclusion of children with Down syndrome who have siblings is facilitated from an early age due to the interaction with their playmates, which has obvious beneficial effects.
Marcu et al. (2007, p. 99) believe that people with Down syndrome cannot adapt to the requirements of the social environment due to their social immaturity, and by no means to the gaps in their interpersonal relationships. This issue is also addressed by Acharya (2011, p. 30), who emphasizes the "positive temperament and social responsiveness, relatively limited maladaptive behavior, and relatively strong adaptive skills" of people with Down syndrome.
Moreover, Marcu et al. (2007, p. 99) consider that children can become integrated adults due to their good individual adaptation rather than the improvement of their intelligence quotients. For this reason, children with Down syndrome should not be isolated from other children, but on the contrary, they must be put in contact with them (Mureşan & Coman, 2011, p. 51), must play with them whenever possible. Children with Down syndrome have the same needs as other children; they need friends, to be included in a group, to feel loved, to belong to a community (Mureşan & Coman, 2011, p. 64).
An instrument that facilitates the socialization and inclusion of people with Down syndrome is represented by motor activities such as physical education, sport, leisure activities, physical therapy, body expression activities (Dragnea & Bota, 1999, p. 24). Socialization developed as a result of practicing motor activities is a complex phenomenon (Dragnea et al., 2001, p. 3) that takes place in two directions: socialization within motor actions and highlighting the socializing effects of motor activities.

Motor activities allow the individual to gain self-knowledge, to better understand their qualities and strengths in relation to other people. The physical, mental and motor gains are visible and extend to the social group to which the individual belongs. But people with Down syndrome have limited awareness of both their qualities and abilities. However, they can become aware of some of these qualities and abilities (intellectual, socio-behavioral ones, and more) with the help of their families, friends or other people they meet during the various activities in which they are involved.

Motor activities highlight the bio-psycho-social capabilities of people with Down syndrome and help them to understand themselves and compare with others. Moreover, by practicing different sport branches, people with Down syndrome allow their peers to know them, to discover their qualities and abilities (Bota, 2016, p. 7). The systematic practice of sport activities develops the sense of belonging to a group, the ability to assess peers and self, the observance of the actions of others, and makes a strong educational contribution due to its specificity, namely competitiveness and team spirit (Marcu et al., 2002, p. 80).

Throughout social life, more than 50% of people with Down syndrome (Leonard et al., 2002, p. 163) experience communication problems. In terms of gender, Leonard et al. (2002, p. 164) have found that males need more assistance and support to communicate compared to females.

The slow development of communication (Malak et al., 2013, p. 805), as well as the "relative weakness in expressive language, syntactics, and verbal working memory" (Gomez et al., 2020, p. 40) have negative effects on social relationships. However, the practice of various motor activities contributes to acquiring superior ways of communication and interaction (Popescu, 2001, p. 93). Malak et al. (2013, p. 805) support this idea by stating that therapy aimed to develop motor functions and educate mental abilities allows these people to participate in social life. Positive effects on communication also appear as a result of associating motor activities with animal-assisted therapy. An example in this regard is the experiment of Griffioen and Enders-Slegers (2014, p. 565), who associated water activities with dolphin therapy.

People with Down syndrome show much empathy expressed by their smiles, openness and warmth to others, which compensates for the gaps in other less developed areas (Fidler, 2005, p. 90). They are also friendly (especially females) (Leonard et al., 2002, p. 163), sensitive, affectionate, attached to their loved ones and lively when they do something they like.

They understand well what to do but react contrary to expectations (Mureşan & Coman, 2011, p. 33). When they are put in a position to do something they dislike, they leave the impression that they want to irritate, provoke and even torture those around them (Mureşan & Coman, 2011, p.33). When they are motivated, appreciated and encouraged to do something, they enjoy and cooperate with others. But we should not forget that people with Down syndrome have low concentration ability, get tired quickly and get bored.

Leonard et al. (2002, p. 163) state that older people with Down syndrome cooperate and socially integrate more easily than children. However, regardless of age, once engaged in an activity, they are concerned with the entertaining aspects, having a high sense of imitation (Fidler, 2005, p. 97). It should be noted that shame is a very strong emotion that often prevents them from completing an activity they are able to do.

Also, the feeling of fear is poorly developed, especially when they trust the people around them. Gomez et al. (2020, p. 40) believe that people with Down syndrome "present fewer emotional and behavioral disorders than other people with ID".
It is certain that "the social quotient may be improved with early intervention techniques" (Bull & Committee on Genetics, 2011, p. 393).
Finally, we can state that adapted motor activities are important social activities that give people with Down syndrome the opportunity to develop physically and mentally, to learn something new, to join other peers who have the same problems, to share with family, friends and other people their achievements that help them to adapt more effectively to different social situations (Bull & Committee on Genetics, 2011, p. 393).

Particular Aspects of teaching swimming to people with Down syndrome

Motor skills specific to swimming techniques can also be learned by people with Down syndrome, but this requires more time, more attention and a lot of patience from the teacher or coach (Bălan, 2018, p. 437). Gradually, through consolidation, swimming leads to the achievement of some objectives (Moanţă et al., 2006, p. 86) such as:
- overcoming psychological fears – swimming helps people with Down syndrome to overcome their fear of water and the depth of the pool, increases their self-confidence (Fragala-Pinkham, O'Neil, & Haley, 2010, p. 163) (a learned skill facilitates the acquisition of a new skill), provides them the opportunity to move freely in a non-specific human environment, where the differences between them and others are less obvious (Bălan, 2018, p. 437);
- increasing the participant's motivation to acquire new motor skills – learning to jump into water from sitting on the edge of the pool leads to increase their desire for learning to jump into water from standing on the edge of the pool;
- meeting the need for movement while considering the interests and needs of the participant.

Fundamental swimming techniques

During the first lessons of the initiation stage, the participant with Down syndrome gets familiar with the environment around the pool, the pool and the water. After entering the water, the process of getting used to it begins, and this step allows the body to make the transition from an ordinary natural environment governed by biomechanical, physiological laws and not only to a non-specific environment that is participant to other conditions. This is also supported by Arnheim and Sinclair (1995, p.161), who believe that no other point in the swimming program is more critical and more difficult to achieve for people with disabilities than the initiation stage.

Entering the water is preceded by a series of additional steps (Arnheim & Sinclair, 1995, p.157, adapted and complemented by us) that the teacher must consider:

- using "relaxation training" – lying face down or face up on the bench or any other object that allows adopting the horizontal position of the body, which is the same as in water;
- performing movements that imitate movements in water – in the warm-up part of the sequence to prepare the body for effort;
- using means that help getting used to wet face and body – a shower before entering the water, rubbing with a wet towel;
- playing with water: splashing around and oneself from sitting on the edge of the pool;
- encouraging the adoption of the sitting position on the edge of the pool with one's feet into water and moving them, which will lead to adaptation to the water temperature and reducing the fear of water.

Adapting to the water depends on several external factors (water temperature, water depth, ambience around the pool, etc.), but also internal factors (disabilities or related conditions, age, emotional instability, motivation, ability to keep focused, etc.).

Arnheim and Sinclair (1995, p. 157) recommend that the water temperature be at least 26.7°C, and its depth, 1m. Fragala-Pinkham, O'Neil and Haley (2010, p. 164) report that they have conducted aquatic programs at a water temperature between 27.7°C and 30.5°C and a water depth between 0.9m and 3m. At the same time, the pool should be equipped with platforms or ladders to allow entering and getting out of the water.

Shallow-water pool should not be used for an extended period because people with Down syndrome learn that they can put their feet to the bottom of the pool if they have any problem (for example: water is up to the face). When they are ina deep-water pool and no longer feel the bottom, they become afraid, which causes different reactions (refusal to enter the water, refusal to leave the edge of the pool, need to be permanently assisted in water while swimming, etc.), and therefore learning must be restarted.

In the learning process, the teacher must permanently help the person with mental retardation. At the beginning of exercises, it would be good for the learner to be supported with the arms for more safety. Subsequently, movements are performed together – walking through water, bouncing, moving objects, etc.

According to Arnheim and Sinclair (1995, p. 158), special emphasis should be placed on play at this learning stage. However, the disability and its degree, the learner's age and availability to participate in such activities must be considered. Games must be changed very often, and their attractiveness must be high to capture attention and keep it during play. There are also people with Down syndrome who are not attracted to this kind of games, preferring the "classic" learning exercises.

Once the person with Down syndrome has successfully entered the water and got used to the "workspace", the next step for them is to learn specific breathing techniques and body position on water. The teacher must demonstrate the execution, and then perform simultaneously with the learner, while permanently keeping in mind that people with Down syndrome learn very well by imitation.

To learn specific breathing techniques, games are recommended to be used, especially those that involve moving objects "by blowing", concurrently with the use of diving next to the edge of the pool, during which the focus will be on "bubbling water". Consideration will be given to the fact that specific breathing plays an important role in learning swimming techniques (Casey & Emes, 2011, p. 328).

A big problem that arises refers to learning **body position on water**. In swimming, the body lies flat on water in prone (ventral) or supine (dorsal), with the arms in a streamline position. If learning the correct prone position on water is relatively easy, learning the supine position is difficult, especially for people who cannot or do not prefer to adopt it on land either. Teacher must first teach the person with Down syndrome the position on land by means of exercises performed together. Subsequently, these exercises must be continued by at home, together with the parents. When the dorsal position on land has been learned, the participant continues with exercises in water, next to the edge of the pool. Specific and non-specific swimming aids will be used – kickboard, floatation belt, inflatable noodle. Simultaneously, the teacher must demonstrate that water will help learners to float if they are relaxed and inhale-exhale quietly (Arnheim & Sinclair, 1995, p. 157). The teacher must be permanently in water, close to the participant with Down syndrome, so as to support the athlete in various floatation positions; gradually, the swimmer will be "released" and encouraged to float independently.

After learning the position and floatation on water, the next step consists in learning to glide on water, which involves the horizontal movement of the body.

The means used can be performed separately but also in combinations. Dynamic games can also be used to facilitate learning and help beginners overcome their fear of water. Gradually, water will become a familiar environment, which will allow easier transition to learning swimming movements, and progress in acquiring the various techniques will be faster.

During the lessons, consideration should be given to the following issues:

-special attention should be paid to the safety of the learner. Nothing should be left to chance;

-great emphasis should be placed on the health status of the learner, knowing that some people with Down syndrome may suffer from atlantoaxial instability;

-the teacher must enter the water and use manual guidance in the learning process;

-the basic technical elements and the four swimming strokes should be learned gradually, in successive stages, with precise tasks;

-the means selected to be used should take into account the needs and capabilities of the learner;

-in most cases, the teacher's patience to the person with intellectual disabilities is the key to the correct learning of the swimming-specific motor skills;
-increasing the level of motivation is essential;
-the new skills to be learned must arouse the interest of the learners;
-individual work is preferable at least in the first stage of learning (Bălan, 2018, p. 437);
-transition will be gradual from the shallow-water pool to the deep-water pool so that the person with Down syndrome gets used to the depth of the water.

If participants learn to swim directly in a deep-water pool, the means performed while walking will be replaced by means performed while moving on water. Movement on water is performed with the help of the teacher (the participant's body is stretched out horizontally on water and is provided with specific and non-specific safety/floatation aids chosen by the teacher– swimming ring, swimming belt, inflatable noodle, kickboard) or independently, in which case the person with Down syndrome (who is provided with floatation aids) uses the leg movements indicated by the teacher. The focus will permanently be on the safety of the participant with disabilities.
The number of lessons addressing the fundamental swimming techniques differs from one person to another. Obviously, at some point in a lesson, some fundamental technical skills will be improved, while other technical skills will be learned. There is no clear delimitation. The stages follow one another depending on the learner's skills, but also the teacher's expertise.

Learning the basic techniques of swimming strokes

In the case of people with Down syndrome, swimming does not respect the classical learning sequence, where front crawl and backstroke can be taught at a time, being followed by breaststroke and butterfly stroke. These people begin with learning front crawl. Only after it has been solidly and properly learned, backstroke is initiated. They are followed by breaststroke and butterfly stroke.
The stages of learning swimming strokes are the same as for typical people, but the time period is longer. They are influenced by both the morphological and physiological characteristics of the disability (Marques-Aleixo, 2013, p. 78) and the training level of the different fitness components – coordination, mobility, endurance, strength.

During learning, several important issues should be considered:
-Imitating the teacher's movements is the key to learning. Even in the consolidation phase, the teacher "swims on land" together with the participant who is in water;
-there are few means that can be used in the learning process;

-Learning-specific gliding exercises cannot be used for a long time in the case of people with Down syndrome. Learners managed to consolidate this skill through the systematic practice of gliding with both arms up and breathing on each arm stroke. When they had to perform the overall swimming technique, there was no positive transfer between this one and the learned analytical exercises. They continued to swim front crawl by gliding with their arms in a streamline position. For this reason, it seems is very difficult to correct a skill in people with Down syndrome. Therefore, we recommend the use of gliding exercises over a limited time (example: in front crawl, gliding will be used only until learners understand how to turn their heads for inhalation, and then the overall swimming technique will be continued);
-special attention should be paid to jumping into water from standing. We think that learning to jump from the edge of the pool should begin after learning aquatic breathing very well so as to avoid inhaling water through the nose. Some people who perform incorrect jumping might refuse to repeat the experience. After an "unsuccessful" jump, the teacher must talk to the person in question who will have to understand that this might happen again; that person must be persuaded not to give up. This is also the case when participants learn the swim start (jumping headfirst from the edge of the pool or the starting block). At the same time, great care should be taken when the jump is performed incorrectly, and the learner's body hits the water. In competitions, people with Down syndrome are allowed to start the race in water or by jumping from the edge of the pool (standing or headfirst) or the starting block (standing or headfirst). Compliance with the FINA regulations is mandatory (both at the start and throughout the race). Any minor deviation from the regulatory provisions entails the disqualification of the athlete;
-Learning begins with the leg movement. After it has been correctly learned, the overall swimming technique of the stroke concerned is initiated. At first, specific aids are used. Gradually, depending on the progress achieved, they are abandoned;
-during learning, consolidation and improvement of the swimming technique, emphasis will be placed on the correctness of movement (Bălan, 2018, p. 432);
-in breaststroke and butterfly stroke, the focus will be on the symmetrical execution in the same plane of both the arm and leg movements;
-butterfly is a stroke that should not be learned by people with atlantoaxial linstability;
-The simple turn will be mainly used. Tumble turns specific to front crawl and backstroke can be learned but we need to make sure that the person does not suffer from atlantoaxial instability;
-After the person with Down syndrome manages to move independently in water, it would be good for him or her to be included into a swimming group (Bălan, 2018, p. 437). Consideration should be given to the person with Down syndrome who learns to swim. In the case of children, they should be included into small groups because they are unpredictable and need to be closely supervised.

-Subsequently, the person with Down syndrome can be included into a group where the other people have a technical level approximately equal to that of the disabled learner. The integration of a person with Down syndrome into a group involves adjusting the training program according to the characteristics and capabilities of the participants. The teacher, but also all athletes in the group, must be much more careful to avoid possible accidents, must show understanding and empathy, and must possess good communication skills (adapted after Izquierdo-Gomez & Diaz-Cueto, 2017, p. 44, and complemented by us). Thus, the differences between the person with Down syndrome and typical people are reduced, which creates conditions for all of them to practice swimming as equals. In this context, swimming is an instrument of inclusion and respect, value and acceptance, a social activity that transcends geographical, political and economic boundaries (adapted after Shriver, 2015);
-Mureşan and Coman (2011, p. 88), as well as Fragala-Pinkham, O'Neil and Haley (2010, p. 170), recommend the permanent assessment of people with Down syndrome. The assessment provides data on learning progress and helps to shape a picture of what we should expect from people with Down syndrome, under what aspect and how to approach them so as to achieve the proposed objectives;
§in case of undesirable behavior, no deviation from the rules (if they exist) should be accepted. Parents or tutors must be permanently informed about what their children are doing in class. This approach aims to consolidate the desired behavior, an aspect also presented by Patel et al. (2018, p. 221);
-the progress of people with Down syndrome in learning to swim is done with small steps. Their individual characteristics and associated conditions leave their mark on the entire educational process (Bălan, 2018, p. 437).

Learning specific motor skills must continue in such a way that people with Down syndrome can consolidate and improve those skills needed to safely move through water (Bălan, 2018, p. 437). Once learned, swimming can become an important means of the intervention program in which people with Down syndrome must participate, a pleasant alternative (Boer &DeBeer, 2019, p. 1453) for land exercises. Swimming is a favorite discipline of people with Down syndrome (Winell & Burke, 2003, p. 439; Kerstiens & Green, 2015, p. 199), in contrast to sport disciplines where the contact between opponents is permanently present (boxing, football, wrestling).

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PART B. SWIMMING LESSONS DESIGNED FOR FOUR DIFFERENT POPULATIONS WITH DISABILITIES

Introduction

(Dr Katerina Asonitou, Balan V., Čander J. Dr Sophia Charitou, Anna Galaiou, P.E. Teacher, Jeromen T., Professor Dimitra Koutsouki, Nikodelis T., Ntampakis I., Mujea A.M.)

The swimming lessons were designed and implemented by the partnership for the four selected types of disability, Autism Spectrum Disorder (ASD), Neurological based Disability, Physical injuries Disability and Down Syndrome. Before presenting them there are some guidelines and tips for instructors working with children with disabilities in swimming.

Guidelines for swimming instructors:

- Ask for your swimmer's medical record (if available).
- Assess your swimmer at the beginning, at the middle and at the end of your program. This will help you to record the progress of your swimmers.
- Use initial evaluation to create individualized programs and to set short-term and long-term goals.
- Keep your daily programs written.
- Evaluate your lesson, so to receive feedback. This feedback will allow you to change and adapt parts of your lesson.
- Keep diary. It will help your reflection.
- Monitor the progress of your swimmer. Check if goals are achieved.
- Adapt your lessons not only on your swimmer's abilities, but also on his/her individual restrictions.
- Start with the strongest parts of his/her motor abilities. This will enhance their self-confidence.
- Cooperate with the parents. Discuss with them observed changes in your swimmer's behavior. Share with them the progress of their child. Acknowledge their effort, their contribution.

Tips for swimming instructors:

- The first thing you should do with your swim students is to develop trust. We recommend that before going near the water, you must develop trust with your students by simply talking with them about their experience with the water and what they would like to accomplish during the lessons. Always be especially careful with adults because they may have issues with the fact that they have put this goal off for so long. Discuss with them and reassure them that it's never too late to learn this essential skill and it is not their fault that they did not learn to swim in their youth. Listen to their stories and early experiences so that they feel relaxed around you.
- Have patience and sympathy, allow them to learn at their own pace. Remember that you are there to help and guide the students — not to push them.
- Get in the water with your student(s) to demonstrate the skills you want to teach them.
- Give a lot of positive feedback, but do not hesitate to tell the novice swimmer what she or he can do better.

- Help them to feel safe in the water; if you can, find a quiet, private environment to teach them, as novice swimmers, people with disabilities and adults may often feel embarrassed that they don't know how to swim. Don't mix teaching groups - do not teach adults alongside with children or in the middle of a crowded pool.
- Start by teaching them basic skills in water that is shallow enough to touch the bottom and once your students are comfortable with this skill, move to the deeper end of the pool if it is possible.
- Always practice in a safe environment.
- Use the swimming drills progressions.
- Decompose complex motions into smaller components and practice the components independently. For example, teach arm motions independently from leg motions. Or teach the arm motions one side at a time.
- Use swimming aids but make sure that the floatation devices don’t become props that the swimmers can cling onto even when they aren’t needed anymore (pull buoy).
- Use dry-land training to rehearse the new motions that you want to teach, lie down on the floor and demonstrate how to execute components of a swimming technique, have the swimmer do the same.
- Be creative while devising exercises to practice stroke components. Trying out new exercises may sometimes be awkward but it’s often a lot of swimming fun too.
- Have fun while you teach, laugh at yourself; if something doesn’t work, try something new.
- Learn and educate yourself as much as you can about swimming, use online videos.
- Get a waterproof digital camera and film your class swimming. Seeing yourself swimming is a great way to become aware of your mistakes.
- Ask your co-workers about mistakes that your swimmers might be making.
- No swimmers have the same physique, strength, balance, physical or learning ability. Be prepared to experiment so that you can find out what works best for an individual. Allow plenty of time for skills to be practiced, developed and acquired to the highest possible level. Every swimmer has a unique style regardless h ability. The strokes taught should be as close as possible to the norm (ASA, 2017).

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Inclusion of Swimmers with a Disability (ASA, 2017): retrieved from www.swimming.org/library/documents/477/download

1. Swimming lessons designed for people with Autism Spectrum Disorder (ASD) (Professor Dimitra Koutsouki, Dr Katerina Asonitou, Dr Sophia Charitou, Anna Galaiou, P.E. Teacher)

Parts of a lesson plan:

A) Intro: Title, goals, short presentation, materials, alternative activities.

Lesson 1: setting the rules

Though children with autism can absolutely learn to swim, factors associated with the condition, such as functional verbal or non-verbal communication, sensory processing disorders and poor motor skills, can make swimming lessons pretty difficult without accommodations. Proper adjustments can have a big impact on children with autism and their families.

Goal: teach the students to behave and more safely in the swimming pool

Short presentation

Discuss the value of the lesson and the behavior rules. Get to know the environment. Practical application of basic hygiene and safety rules.

1. Teacher-Student Acquaintance: At the beginning we discuss with the child in the presence of the parent and judge if he/she is ready to leave his/her parent. If the child is ready, then we offer our hand and together we proceed for the tour - familiarization by the pool area (without the parent). If he/she is not ready, then we ask the parent to escort us on the tour (be careful the parent should not participate in all the lessons; there will be a gradual independence).

2. Getting to know the place: We walk by the pool in order to explain the rules of the swimming pool and where the equipment is located (floating belt, balls, toys, resistance boards, water noodles, etc.).

3. Familiarization with water: We hold the student by the hand, and we attempt to sit on the bench around the pool walls. We welcome the student and explain to him/her what activities will follow.

Material

Adjustments to rules and policies.

Some pools or swim clubs may require particular attire or equipment (a swim cap or goggles) for swimming lessons. This kind of equipment may cause anxiety or discomfort to children with autism. So, the child may need to get some lessons out of the pool to get familiar with this equipment.

- **Kick boards.** These can help keep a new swimmer afloat while they practice their leg kicks. If the child has trouble gripping, there are some boards that have handles to make it easier to grab (livestrong.com explains the benefits of kickboards).
- **Swim gear.** At the beginning, the child may need to put a life vest or other flotation device to help the child stay afloat. When choosing a device pay attention to comfort and fit.
- **Goggles.** If the child is bothered by getting water in their eyes, be sure that he/she is wearing goggles (that are the right fit).
- **Water noodles**. They must be colorful, so the child finds them funny to use.
- **Ear protection.** If ears are an area of sensitivity for the child, teacher might have to search for products or ways to protect ears (block water from reaching the ears).
- **Avoid sensory overload.** Unused toys or toys bins may have to be kept out of sight, especially for children with sensory processing. In such cases, we introduce selected sensory toys one at a time. Also, the teacher can allow the child with autism to hold his favorite toy if he can't leave it.
- The teacher keeps **language concrete.**
- **Social skills** are taught directly.
- The teacher must **be consistent**. Repetitive skill practice can enhance student learning.
- **Introduce change slowly**. Do not bounce from one skill to the next, as it can be confusing. Spend time laying out a lesson that will benefit the child best and slowly introduce the changes or transitions.

Here are some suggestions of activities:

Activity 1: We walk parallel to the pool wall (until we get back to where we started) to see the various depths that exist (we hold the child's hand, especially if he/she is scared).

Activity 2: Hold both hands of the child (face to face), keep standing and make bubbles. If the child cannot perform the previous activity, we alternate it by using straws (the instructor has a straw - the child has a straw) and make bubbles with them. If he/she succeeds, we start walking in the water and make bubbles while the child holds the trainer's hand (this activity can also be done with the straw).

Alternative activities: 

Identify which of the rules do you follow at home?
Discuss why do we need to learn swimming?

-Talk to the child about swimming using, for example, a book social story in order to explain how to swim and what to expect when taking swimming lessons.
-Show the child photos, pictures or videos of people swimming for getting the child accustomed to the idea of swimming lessons.
-Take the child to the pool and give the opportunity to observe swimming lessons. Introducing the child to the location where swim lessons will take place can help him/her to become familiar with the place and feel more comfortable. Also, the opportunity to watch a swimming class in progress before participating in one himself/herself, consists a benefit for children with autism because: a) they observe the teacher who is giving instructions; b) the teacher has the opportunity to point out proper behavior around the pool, including how to walk around the pool deck and how to enter and exit the water.
-Play in the pool with the child. Teacher may have some fun activities into the pool and join the child before swimming lessons to help alleviate his initial discomfort and feel that pool is safe.

B) The contents: organized to objectives facilitating the general goal, with specific exercises and organizing tips as well as an indicative duration of every objective

Contents	Exercises-organizing tips	Duration
 **Get to know – inform**	Walk the route: Entrance-locker room- shower-pool-meeting corner. • Show them the places of the facility • Show the child to wear a wetsuit. Many autistic children are more comfortable in the water when wearing a wetsuit than a traditional swimsuit. They feel more secure, warm and it hugs their body. • Show a quiet room where the child can go if she/he needs to be alone and remove himself/herself from an overstimulating environment. It doesn't need to be an actual room, but this would be an area away from the noise and activities where the student could go if he/she needs a quiet break.	5 '

Get to know – inform	Gather at the meeting corner and start informing them • Offer an introduction to the pool environment for new swimmers. This would include giving students exposure to the noises, smells, water temperature, other activities in pool, and lifeguards. • Prepare students for the loud sound of the lifeguards' whistles. Demonstrate the whistles, explain why they are used, and possibly allow the student to blow the whistle • Provide written or pictured schedule (depending on the student's communication style and age) as many people with ASD tend to be visual processors. A wipe board with an agenda may work. Be sure to include the expectations of the student for that particular lesson.	10 '
Use of shower and lockers	Walk the route back and prepare for lesson. • Show them how to get undressed in the swimming pool. • Create a routine for the shower	10 '
First experience of the pool **Dimmed lights and noises, and loosened rules** -Hold classes during times with limited distractions. Many unexpected things can be distracting for students with autism.	**Rules:** • **Look** for the signs posted in a swimming area for safety information. The rules in the pictures are there to protect you and to keep pools clean and germ-free (pictures for dangers such as water depth, water temperature, current and slippery surfaces. first aid kit, electricity, etc). • **Walk, do not run**. Never run on the pool deck. This area can be very slippery, especially when there is water on the deck. • **Be careful getting in and out of the pool**. Use a handrail whenever possible to prevent slipping or falling. When getting out of the water, avoid climbing on slippery or other unstable surfaces. • **Always check your surroundings** and enter the water slowly with your feet first in order to avoid an injury.	5 '

-Consider potential fear of water among elder children. -Relax apparel policies on goggles, caps, etc if applicable. Some of these items may be too uncomfortable, even painful for students with heightened sensitivities.	• **Always wear your lifejacket.** • **Look for no diving signs**. Only dive into areas where it is safe to dive (regarding to depth).	
Familiarization with water These activities are best when swimming lessons start. Especially, because of such close contact of the instructor with the trainee. Later on, when the child gets accommodated with the procedure, the trainer's position is replaced by an auxiliary instrument (pool noodles, swimming boards, etc.), until the child swims without any auxiliary means.		10′
 **Game activities**	• Create a routine for each lesson. Each lesson should include a warm-up and cool-down routine. These should be the same routines for every lesson and can be as simple as splashing water, kicking on the step, or blowing bubbles. Routine will help calm the child's nerves and increase confidence in completing tasks.	5′

	• Each swimming lesson could be starting and ending with a song as a sort of routines. Except of song teacher can create one routine for his student by doing specific things before and after each lesson.	
Exit the pool – dress –eat fruit	Walk to the showers, wash and get dressed • Create a routine for dressing • Create a routine after dressing (e.g. eat a fruit).	10 ′

C) Points to discuss, safety rules, key words

Proposals for the teachers of what to discuss and what to pay attention to regarding the safety of the children during the lessons.

Discussion points	When are we in danger within the facility? Why is it important to have a shower before and after the lesson?
Safety	The analogy is 1/1 The teachers are always in the water with the swimmers.
Key words	Water – Hygiene – shower – dressing – fruit

Lesson 2: Breathing

The initial stages of breathing in the water are among the first skill an instructor teaches anyone interested in swimming. The contact of a child's face to the water is not always easy, especially for children with ASD. As a result an instructor should be extra careful, so as not to scare the child and subsequently damage the trust between the dyad (instructor - trainee).

Goal:

Developing trust. Teach the child to breath in water and to move exhaling bubbles in the water**.**

Short presentation:

Discuss the value of breathing and why it is so important for anyone starting to learn how to swim. Practical application of breathing in water.

1. Initial Stage:
We find ways to make the child insert his/her head in the water. If the child finds it relatively easy, we stay at the wall and show him/her how to blow bubbles under water. If it is difficult for the child, we try some alternatives, like the use of a straw, or we ask the child to full his/her palms with water and blow there some bubbles. (Attention: the straw should not be used during the whole lessons period. It must be dropped gradually).

2. Getting accustomed to water and bubbles
At first, we hold the instructor's hand and we stay at the pool deck of the swimming pool. We welcome the child and explain the activities that follow.

Material:


Straws

Here are some suggestions of activities:

Activity 1:
The child remains at the pool deck and the instructor asks him/her to gradually wet himself/herself using his/her hands. That is, at first, he/she wets feet, then his/her belly, his/her hands and last his/her head (during this last stage the instructor could say: “let's go get our faces washed like we do in the morning after getting up, show me how you wash your face”.) The instructor stands before the child and performs the exact same activities with him/her, unless of course the child feels uncomfortable or scared. In that case the instructor stays beside the child to make him/her feel safer or more reassured.

Activity 2:
Hold both hands of the child (face to face), keep standing and make bubbles in the water. If the child cannot perform this activity, we perform an alternate one by telling him/her to fill his/her palms with water and to blow in there (the instructor performs along with the child). If it is successful, then we start walking in the water making bubbles in the same way, while the child is holding the instructor's hand (we walk their steps, pause, let the instructor's hand, fill our palms with water and blow).
If the child finds this difficult, as well, then we alternate by using straws (the instructor has a straw - the child also has one). The performance is done as previously.

Activity 3:
Without holding the child's hands anymore, we perform "like frogs" (the instructor stands beside the child and performs with them), three steps, bend their legs until their face touches the water and blow bubbles. If the child is afraid, the instructor holds their hand to make them feel safer.

Activity 4:
In this specific activity we perform three steps and dive with bubbles (be careful to dive in the shallows to avoid an injury).
Attention!! If we feel at any time that the child is either afraid or unable to perform any of the activities, we don't pressure him/her but return to a previous activity or perform an activity through play, in case the child needs extra time to accustom.

Alternative activities: 

- Show photographs to the child, photos or videos of people creating bubbles to accustom the child with it.

- Play in the pool with the child.

The instructor could perform activities in the pool which are fun, concerning breathing in water. As for example, a variation of the traditional game one-two-three red light.
Game explanation: the instructor counts one-two-three, during that space of time the child has the right to walk or run towards the instructor. When the instructor says red light, he/she must remain still and make bubbles in the water until the instructor starts counting again. If the child manages to outperform the instructor, then the child must run quickly back to the wall designated as protected zone.

Contents	Exercises-organizing tips	Duration
Start of Exercises	Welcoming the child with a song.	5 ′
Repetition of Exercises	Activities selection according to the child's needs in relation to previous lessons	10 ′
New Exercises	Each of the new activities is performed 4 times (until the opposite side of the pool and back again). However, playing time at the end of the lessons should be related to the activities.	15 ′
Game	" One-two-three red light"	15 ′
Relaxation	Song and farewell	5 ′
Exit the pool	Walk to the showers, wash, and get dressed.	10 ′
Discussion points	• Why is it important for a swimmer to be able to put his head in the water? • Feelings, trusting, what is new, what they have experienced during the lesson	

Safety	The analogy is 1/1 The teachers are always in the water with the swimmer.
Key words	Water - familiarity - breathing in water - partially submerge the head - the face

Lesson 3: Floating

Floating is one of the most difficult aspects in swimming, especially for people that are afraid of water. A great deal of trust from the trainee to the trainer is required to make the whole floating process easier. Thus, the instructor should be very careful with his/her moves to avoid panicking the student. When the child acquires this skill, it is easier for the instructor to teach any other skill.

Goal: Teach student to float on the water

Short presentation:

Discuss the value of floating for swimming. It is important to teach persistence in the case of a possible failure. The child must keep trying until he/she succeeds.

1. Initial stage of floating:
After a couple of lessons in the water, the instructor is able to assess a child's ability in water. If the child finds it easy to float, we ask him/her to remain as a " starfish" for a few seconds. If the child finds it difficult, then we ask him/her to lay on the instructor's arms (gradually replace the arms with a floating mattress). The removal should be achieved gradually and only when the child is ready, so as to avoid, either fear or attachment.

2. Floating and propulsion:
We welcome the student, and the lesson starts with the usual routines (songs at the beginning and so on) and we repeat the activities from the previous lesson (without any lengthy instructions or repetitions since the child has done all these during the previous one). We explain what new activities will follow.

Here are some suggestions of activities:

Activity 1:
Ask the child to remain "starfish" for a few seconds (supination). If the child cannot manage by itself then the instructor helps by holding either their head or the shoulders or even under arm (depending on the extend of touch the child allows and on how safe he/she feels).

Activity 2:
We continue to hold the child, either from the head or shoulders or underarm and take him/her for a stroll in the pool, so as to let the child feel the water on their body. The stroll has to be reformed in a slowly and at a steady pace to avoid fear (backstroke). Then, as we keep proceeding in the pool we roll the kid once on the right side and once on the left side (each should be done twice).

Activity 3:
We ask the child while in backstroke with the help of the instructor, to move their feet. Then we replace the instructor's arms with a floating board (the instructor helps with propulsion if necessary).

Materials:

Board, cassette player and CDs with children songs.

Alternative activities:

If the child reacts negatively to these specific exercises, then we can move to the shallow part of the pool and adjust the exercises. For example, while in supination we touch the bottom of the pool and ask the child to move to the other side of the pool. If this is impossible, then the instructor can ask the child to sit on him/her to feel safer and the instructor moves the child to the other side.
Play in the pool with the child.
The teacher can perform some very entertaining activities in the pool concerning floating on water, in relation to each child's ability. Like "freezing starfish". The game is as follows:
When the music plays the child has the right to move in the water in whatever way, but when the music stops the child has to remain motionless in the "starfish" position. (this game is played in the shallow part of the pool, because if the child cannot remain afloat motionless, it can try by placing its hands on the bottom of the pool). When the music starts again the kids can move again at will.

Contents	Exercises-organizing tips	Duration
Start of Exercises	Welcoming the child with a song.	5΄
Repetition of Exercises	Activities selection according to the kids' needs in relation to previous lessons	10΄
New Exercises	Each of the new activities is performed 4 times (until the opposite side of the pool and back again).	15΄
Game	" Freezing Starfish"	15΄

Relaxation	Song and farewell	5′
Exit the pool	Walk to the showers, wash and get dressed.	10′
 **Discussion points**	• Why is it important for a swimmer to know how to float in the water? • Feelings, trusting, what is new, what they have experienced during the lesson	
 **Safety**	The analogy is 1/1 The teachers are always in the water with the swimmer. It is important to follow a slow rhythm and keep reinsuring the swimmer, that he/she is safe. Remember each swimmer will move at his/her own pace.	
 **Key words**	Water - familiarity - breathing in water – floating - feeling the water	

Lesson 4: Propelling

The study of the propulsion of the human body in water is a combination of the fields of biomechanics and hydrodynamics. So in addition to the movement of a swimmer's arms and legs to push him into the water, an instructor should know the resistance exerted in the water and how to fight it:

Position resistance: The more horizontal the position of the body in the water, the smaller the position resistance.

Ripple resistance: The ripple resistance is caused by the swirls on the surface of the water created by the swimmer's movement.

Abrasion resistance: Abrasion resistance is due to the contact of the swimmer's skin and hair with water (when referring to children this resistance factor does not concern us).

Goal:

Teaching students to float on water and move by blowing bubbles

Short presentation: 

Discuss with the children what has been said above about floating and resistance forces, what happens when our body is in the water, how resistance forces are created and what they need to do to prevent the body from resisting the water. (The teacher's advice to the learner, before presenting the exercises). Practical application of water propulsion.

1. Initial stage of propelling:
If the child in front of us has good floating on the water, then we give him a board and tell him to hold it from the "holes" and tell him to flap his feet until he reaches the opposite side of the pool (the teacher shows exactly what he is asking from the student to do). However, if the student in front of us is afraid to grab the board for some reason, then the teacher supports the student and helps him to reach the opposite side of the pool, without putting his head in the water.

2. Floating and propulsion:
We welcome the student and the lesson starts with the usual routines (song at the beginning, etc.) and the exercises from the previous lesson are repeated (without extensive explanation). The exercises from previous lessons are selected by the teacher, according to the students' needs. We explain what new activities will follow.

Here are some suggestions of activities:

Activity 1:
Ask the student to hold the board by the holes and move his feet to the opposite side of the pool. If you notice that the child cannot cope with the skill with the board, then the teacher supports the student by the hands (the exercise is performed in the same way as if there was a board).

Activity 2:
The student in this exercise holds his board from the bottom, from the "ears" and move his feet to the opposite side of the pool wall, this time making bubbles. If the student finds it difficult, then the role of the board is taken by the instructor.

Activity 3:
In this exercise the student will place his hands again in the holes of the board, move his feet (usually we measure 6 feet) and make a hand (6 feet a hand with the right hand, 6 feet a hand with the left hand), the child's head is out of the water (without breathing). If the child has difficulty with the board alone, the instructor helps.

Activity 4:
The student continues and holds the board from the "holes". The instruction given this time by the instructor is 6 feet, one hand with the right hand, 6 feet one hand with the left hand and 6 feet and a bubble. (The teacher helps where he deems it necessary).

Materials:

Planks, plastic ducks and plastic dolphins

Alternative activities:

If the child reacts to the specific exercises, then we can move to the shallows of the pool and adjust the exercises.

- Play in the pool with the child.

The game: "Fishing in the pool"
We give the child a board and the teacher gets a board. On one side of the pool we have placed 4 baskets (2 yellow and two blue), one yellow and one blue for the teacher and the other for the student. The teacher throws "ducklings" and "dolphins" in the pool, which do not sink in the water, but remain on the surface. The aim of the game for both (student and teacher) is to hit the legs of the chosen animal with their board, fish it with their hand, put it on their board and place it in the respective basket (the ducklings enter the yellow basket, while the dolphins in the blue basket). The game ends when all the animals are placed in their baskets. At the end of the game, the teacher and the student go to the baskets and check if the animals have been placed correctly in their baskets.

Contents	Exercises-organizing tips	Duration
Start of Exercises	Introduction with a little song and welcoming of the kids	5΄
Repetition of Exercises	Activities selection according to the kids' needs in relation to previous lessons	10΄
New Exercises	Each of the new activities is performed 4 times (until the opposite side of the pool and back again).	15΄
Game	"Fishing in the pool"	15΄
Relaxation	Song and farewell	5΄
Exit the pool	Walk to the showers, wash and get dressed	10΄
Discussion points	• Why is it important for a swimmer to know the right way to advance in the water? Feelings, trusting, what is new, what they have experienced during the lesson.	

Safety	1/1 The teachers are always in the water with the swimmers.
Key words	Water - feeling of the water-floating and advancing in the water

Lesson 5: Diving

Diving in water for some children who have good contact with the water is an activity they really like because they see it as a game, and they enjoy it. However, the most difficult thing for the teacher is to teach a child who is afraid of water, to get to the point of diving. The majority of children with autism spectrum do not enjoy putting their head in the water or diving alone.

Goal:
Teaching students to immerse their heads in water

Short presentation:

Discuss with the children the process that will be followed to learn head-out water immersion and the reason why it is necessary to be learned. What happens when we are under water and what is the most tried and tested way to manipulate our body under water so that we feel safe even when we are under water? (The trainer gives advice to the trainee, before presenting the exercises). Practical application of diving.

1. Initial stage of propelling:

In the first stage, on the shallow side of the pool, the teacher asks the child to walk in an upright position for three steps and then with his hands up and together to fall into the water and hit his feet hard (for as long as he can). If the student is scared, then the teacher can take the student and go inside for a while. Holding the child's hands the teacher asks him to hit his feet and after counting until three (one - two - three) to put his head under water. The teacher helps him by lightly pulling the child's hands so that he understands the meaning of immersion in water.

2. Floating propulsion and diving

We welcome the student, the lesson starts with the routines (song during the application, etc.) and they require repetition of the exercises from the previous lesson (very close to ourselves). Exercises made from lessons taught by the technician, required with the data of his students. We explain the activities that will follow.

Here are some suggestions of activities:

Activity 1:

The student sits at the wall of the pool and waits for the teacher to present the new activity. The child walks in the water from his shallow side, makes three steps, ties and raises his hands high, falls into the water. The child continues to have his hands up and by tapping his feet he is pushed into the water.

Activity 2:

On the deep side of the pool, the teacher and the student make jumps like the "frog", three jumps moving to the other side of the pool, one - two and in the third jump the student dips his head under the water and makes bubbles at the same time.

Activity 3:

On the deep side of the pool, the teacher and the student make jumps like the "frog". The teacher holding his student by the hands, three jumps moving to the other side of the pool, one - two and in the third jump the student dips his head under water. The teacher stretches the student's hands and asks him to strike hard the legs. (The student's head stays under water for about 3 seconds).

Activity 4:

We continue to be on the deep side of the pool. We raise the child to the wall of the pool and ask him to dive (2-3 dives) as he wants (the teacher is next to the student, so that there is no accident). Then the teacher holds the student's hands while he is again on the wall ready to dive; as soon as the student falls into the water, the teacher pulls him lightly by the hands for a few seconds (about 3 seconds).

Materials: 

Plastic fish toys, which are submerged in water

Alternative activities: 

If the child reacts to the specific exercises, then we can move to the shallows of the pool and adjust the exercises.

- Play in the pool with the child.

The game: "Spear gun"

The student sits on the wall and the teacher explain how the game is played. The teacher throws the fish toys into the water and waits a few seconds for them to sink. Then, he asks the student to pick up the fish and place them in the basket which is located at the overflow of the pool (one fish at a time the child has the right to catch). The game ends when the child collects all the fish from the bottom of the pool.

Contents	Exercises-organizing tips	Duration
Start of Exercises	Introduction with a little song and welcoming of the kids	5΄
Repetition of Exercises	Activities selection according to the kids' needs in relation to previous lessons	10΄
New Exercises	Each of the new activities is performed 4 times (until the opposite side of the pool and back again).	15΄
Game	"Spear gun in the pool"	15΄
Relaxation	Song and farewell	5΄
Exit the pool	• Walk to the showers, wash and get dressed	10΄
 **Discussion points**	• Why is it important for a swimmer to be able to put his head in the water? • Feelings, trusting, what is new, what they have experienced during the lesson	
 **Safety**	1/1 The teachers are always in the water with the swimmers.	
 **Key words**	Water - feeling of the water-floating - advancing in water and gliding.	

2. Swimming lessons designed for people with Neurological based Disability (Nikodelis Thomas, Ntampakis Ioannis)

Neurological disability covers a wide spectrum of disabilities. There are cases of people that suffer from multiple disabilities. Mental ability may also be affected, while one of the most common associated symptom-problem of neurological disability is spasticity. Under this perspective, it is apparent that each individual is unique in terms of his/her learning ability and should be treated as so. This is the case for the following swimming lessons which are structured as a general guide for teaching the basic swimming skills, yet they should be adapted to each swimmer with neurological disability. Below some general tips are given:

Regarding multiple disability, depending on the situation, teachers could try to achieve passive movements with their swimmer, or provide him/her with a facility and apparatus to carry out the required moves.

In case of a swimmer with reduced mental ability, it would be better for the teachers to demonstrate the activities rather than explaining them because it is more possible that the swimmer will manage to imitate what he/she will see. The teacher can also drive (lead) the swimmer like a puppet to achieve the movement pattern.

When spasticity coexists, it is necessary to maintain stretching between the exercises so that the swimmer will not be stiff and have a better result.

The following lessons, among others, propose some indicative alternative activities as adaptation to the described exercises with respect to the aforementioned. All the lessons are structured under the idea of the swimmers' inclusion with typical swimmers, and although they are not exclusive, they are oriented to younger swimmers (children and adolescents).

Parts of a lesson plan:

A) Intro: Title, goals, short presentation, materials, alternative activities.

Lesson 1: Setting the rules
Goal: Teach the swimmers to behave and move safely in the swimming pool
Short presentation:  Discuss the value of the lesson and the behavior rules. Get to know the environment. Practical application of basic hygiene and safety rules.
Alternative activities:  Identify which of the rules do you follow at home Discuss why do we need to learn swimming

B) The contents: organized objectives facilitating the general goal, with specific exercises and organizing tips as well as an indicative duration of every objective

Contents	Exercises-organizing tips	Duration
 **Get to know – inform**	Walk the route: Entrance-locker room- shower-pool-meeting corner. • Show them the places of the facility, if necessary, they have to use the "Disable People's Lockers with their caregiver.	5΄
	Gather at the meeting corner and start informing them. The meeting point should be accessible with a wheelchair if needed.	10΄
 **Use of shower and lockers**	Walk the route back and prepare for lesson. • Show them how to get undressed in the swimming pool. Alternatively, for a paraplegic swimmer show him/her how to undress only his/her torso. • Create a routine for the shower Alternatively, the routine can be customized on a plastic wheelchair.	10΄
 **First experience with the pool**	Walk towards the pool slowly and carefully.	5΄
 **Familiarization with water**	Wash your face • Ask them to do the exercise only by showing them/or without showing them Alternatively, for a multiple's disability swimmer, or a blind one, we can wash it for him/her • Wash teacher's face.	10΄
 **Game activities**	Play chickens • Let them choose how to do it/ or show it (...do the chickens....)	5΄

Exit the pool –dress –eat fruit	Show them how to exit and how to walk towards the locker room. Alternatively, a swimmer with spasticity can use a special chair to exit the pool.	5΄
	Walk to the showers, wash, and get dressed • Create a routine for dressing Alternatively, a swimmer with mental disability can be helped by his/her classmates	10΄

C) Points to discuss, safety rules, key words

Proposals for the teachers of what to discuss and what pay attention regarding the safety of the students during the lessons

Discussion points	When are we in danger within the facility? Why is it important to have a shower before and after the lesson? Why is difficult for all of us to get out of the pool by the ladder?
Safety	The analogy is 1/1 The teachers are always in the water with the swimmers. The facilities are proper for disabled people.
Key words	Water – Hygiene – shower – dressing – fruit

Lesson 2: Familiarization with the water
Goal: Teach the swimmers how to be comfortable in water
Short presentation: Learn how to enter and exit the pool and accept the sense of the water to their body
Material: Swimming tubes
Alternative activities: Swimmers have to find why the exercises are difficult to be applied at the sea

Contents	Exercises-organizing tips	Duration
Get to know – inform	• Leave the water to flow on your face. • Do the same with your eyes open	5΄
	• Take the water in your mouth and make a fountain Alternatively, a swimmer with spasticity can use a straw to take the water in his/her mouth	5΄
Exercises to get in or get out of the pool	Discuss about the easier way to get in or out of the pool. • Special equipment can be used to enter the pool, like a specific crane. • Less equipment can be used with two assistants. Firstly, we have to show what the swimmer has to do.	15΄
Exercises to feel the water	• Catch the water with your hands • Feel the sense of the water • Throw the water away • Wash your body	5΄
Familiarization with water	Wash your face Alternatively give a watering hose to a multiple's disability swimmer to use • Ask them to do the exercise only by showing them/or without showing them	10΄
Walk in the water	Run in the water Make side steps in the water Move like a kangaroo Turn in the water Alternatively, the swimmer could ride a tube with the teacher to move more easily.	10΄
Games	• Try to make waves and move in the water. Who is going to make the biggest wave	10΄
Discussion points	Why it is important to keep our eyes open in the water What happens when we run in the water	
Safety	The analogy is 1/1 The teachers are always in the water with the swimmers. The depth of the pool is up to the chest	
Key words	Shower – open eyes in the water – Feel of the water	

Lesson 3: Familiarization with water and breathing

Goal: Teach the swimmers how to be comfortable with water

Short presentation:

Learn how to get comfortable with water and breathing

Material:

swimming board

Alternative activities:

The swimmers with the help of the teachers can find exercises that can take place in their bathroom

Contents	Exercises-organizing tips	Duration
Prepare – enter the pool	Get in the pool • Repeat the routine entering the pool	10΄
Familiarization	Play the drums. • swimmers use their hands to hit the water following the rhythm of the teacher, or not Blow the surface of the water. • Make “a hole in the water” • Take the water in your hands and blow it away Whose car rev up stronger • Ask swimmers to make the noise of the motorcycle to learn how to blow from their mouth • Ask swimmers to watch the bubbles that they are making Mimic the voice of the cow (out of the water) Repeat the same in the water • Show swimmers how to do it by getting in the water and making too many bubbles from their nose. Alternatively, try to blow balloons on the surface of the water or push a ball with the nose like the harbor seal and singing like “mmmmm”	10΄

Familiarization with moving	Move the swimming board with different ways: • Encourage swimmers to find strange ways to move the swimming board like using the arms, the corps, the bottom, the elbow, the back, the chin, etc. • For a swimmer with spasticity in order to achieve these exercises, it is necessary to maintain stretching between the exercises, so he/she is able not to be stiff and have a better result.	10 '
	Balance the swimming board on your head • Do the same while walking and change directions	10 '
 **Games**	Make a tower with the swimming boards • All swimming boards are in the pool and swimmers are trying to collect them and build the tallest tower	10 '
 **Discussion points**	Why it is important to blow both through the nose and mouth in the water	
 **Safety**	The depth of the pool is up to the chest	
 **Key words**	Nose – Mouth – Breathing	

Lesson 4: Breathing with propulsion

Goal: Teach the swimmers how to move while breathing in the water

Short presentation:

Learn how to move and breath at the same time

Material:

ducks, small plastic balls, swimming boards, swimming tubes

Alternative activities:

Swimmers have to find the difficulties if they apply these exercises at the sea.

Contents	Exercises-organizing tips	Duration
Preparation – Familiarisation with water	Get a shower with the water of the pool • Make representation of the cleaning bath	10 ′
Breathing with propulsion	Blow to the floating objects (ducks, plastic small balls). The mouth is on the surface of the water. In pairs the swimmer and the teacher grab the swimming board and blow one time each. Move the ducks on the water by blowing them. Alternatively use lighter or bigger objects like balloons	10 ′
	Dig with your hands to make a creek between your legs and blow from your mouth. • Dig with your hands like a spoon kicking in prone and supine position at the edge of the pool. • Flex the hips instead of the knees • Make sure that swimmers keep kicking or digging while breathing Depending on the situation we can use different ways of digging or alternatively we can dig on a “tatami”	5 ′
	Try to pass under the swimming tube by sinking the head in the water and blowing through the nose and mouth. Alternatively, for a multiple’s disability swimmer we can use a pathological leg kicking that is different, but for this person can be functional.	5 ′

	Choke the snake: Imagine that the tube is a snake that is trying to bite you. Try to choke the snake first to win it.	5’
 **Games**	The fool game: Try to catch the fool, participate in the game. During the game it is better for the teacher to be near this/her swimmer for a good core stability, and a more active participation.	10’
 **Discussion points**	Where do you have to bend your leg for better propulsion in the water	
 **Safety**	The depth of the pool is up to the chest	
 **Key words**	Breathing – coordination – propulsion	

Lesson 5: Sinking – Floatation – Propulsion
 **Goal:** To combine diving, floating and propulsion
Short presentation:  Learn how to dive, float and move under the water.
Material:  hoops, plastic rings, swimming tubes, swimming boards, swimming belts, bicycle inner tube
Alternative activities:  Swimmers have to think how they can help their classmates for the digging exercise.

Contents	Exercises-organizing tips	Duration
Prepare – familiarization with water	Throw water to each other: • Swimmers shouldn't have physical contact with each other.	10′
Familiarization	• Every swimmer walks around a hoop. • When the teacher says, they have to get in the hoop by blowing in the water. Use plastic rings and give them to each other under the water • Try to keep the eyes open while in the water. Put a plastic ring on your head and try to get in and out of the water without dropping the ring. Alternatively collect the rings from teacher's hand.	10′
Familiarization with moving	Use the swimming tube to lie on the water and make the starfish • Place the tube at your waist • Use the tube along the body Open and close the arms and legs to move Alternatively, we can use more tube at different body positions, or bicycle inner tube to help the swimmer feel safer.	10′
	Place the swimming tube under your arms and start digging in the water. • Use your hands like a spoon • Keep your hands in the water • Do the same with kicking Do the same with the swimming belt only.	10′
 **Games**	In pairs hang on the swimming board and try to drive the swimming boards to your side	10′
 **Discussion points**	Why it is easier to move with the hands like a spoon?	
 **Safety**	Follow the 1/1 rule	
 **Key words**	Head in the water - starfish – relax– Dig	

Lesson 6: Floating- Propulsion – Diving

Goal: Teach the swimmers how to move while breathing in the water

Short presentation:

Learn how to move and breath at the same time

Material:

swimming boards, swimming tubes, swimming belts, floating mat

Alternative activities:

Swimmers have to apply what they have learned at the sea.

Contents	Exercises-organizing tips	Duration
Preparation – introductory games	Floating boats • The swimmer is making the starfish in prone position with the head in the water and the teacher drives him/her in the water counting to 4. • The same in supine position Trolleys In pairs, the teacher and the swimmer are moving around the pool, the swimmer is digging while the teacher is holding him/her from the legs or the waist.	10΄
	Sit on the edge of the pool and kick your legs • Remind them which joint is better to bend their legs Alternatively, for a multiple's disability swimmer, could be easier to do the kicking lying on a floating mat.	5΄
Combination of floatation and propulsion	Catch the edge of the pool in supine position and do the leg kicking • Do the same by blowing in the water • While blowing push the wall and keep kicking your legs to catch it again. Alternatively, instead of the wall swimmers can catch teacher's shoulders	5΄
	Catch the swimming board in prone position and move with kicking. • First catch the swimming board from the top • Then catch the board from the bottom to combine breathing as well.	10΄

	Catch the board in supine position and move with kicking • First hug the board with your corps • Then keep it with your legs and try not to hit it with your knees. Alternatively, for a multiple's disability swimmer is easier to start learning kicking in supine position, progressively: • lying on teacher's shoulder • lying on a floating mat • lying on a tube	
Combination: Floatation, propulsion, diving	Dive like the candle, dig to the teacher, turn in supine position and start kicking for 10 meters. Alternatively dive by siting on the edge.	10΄
Discussion points	Which is the easier way to propel yourself from those they have learned?	
Safety	Swimmers have to wear swimming belts for floating	
Key words	Propulsion – leg kicking – supine	

Lesson 7: Floating – Diving
Goal: swimmers learn how to move underwater
Short presentation: swimmers learn how to dive and collect objects from the bottom of the swimming pool
Material: plastic rings, swimming buoys, swimming tubes, metal rod, colorful balloons
Alternative activities: Swimmers have to find the difficulties of applying these exercises at sea.

Contents	Exercises-organizing tips	Duration
Preparation – introductory games	At the edge of the pool, diving with rotation • Ask swimmers to leave their hands and make a round around themselves • Ask them to make two rotations, clockwise and anti-clockwise • Do the same with the face in the water	**10΄**
	In prone position catch the edge of the pool and do the leg kicking. • The teacher dives in the water and tries to catch the swimmer • The teacher shows colorful rings underwater and the swimmer tries to find the correct number • The swimmer tries to catch the ring with the correct color that the teacher has requested	**10΄**
Combination of diving and breathing	Catch the edge of the pool and when the teacher requests, leave the wall and try to sink to reach the bottom. Do the same using the teacher's hand, and when the swimmer reaches the bottom the teacher releases the swimmer to push and get on the surface on his/her own. • Do the same, using the swimming tube Alternatively, diving can be performed at a shallower depth with the swimmer being in teacher's arms.	10΄
	Push the wall to pass between teacher's legs. • Do the same while increasing the distance • The teachers holds the swimming buoy with his/her legs and asks the swimmer to take it	10΄
Recovery	Dive from a height and dig to the ladder. • Who is going to make the funniest jump? • Who is going to jump over the tube? Alternatively, swimmers can dive holding the teacher's hand or/and from the deck.	10΄
Discussion points	Where it is safer to dive	
Safety	The depth has to be over 1,50 meters	
Key words	Diving– Breathing – Plunge	

Lesson 8: Diving and Propulsion games

Goal: Swimmers learn how to move while breathing

Short presentation:

swimmers learn through games how to dive and move in the water

Material:

swimming tubes, rope, plastic boats

Alternative activities:

Swimmers have to find the difficulties of applying these exercises at the sea.

Contents	Exercises-organizing tips	Duration
Preparation – introductory games	The hunter and the ducks. • The teacher chases the swimmer to catch him/her with the swimming tube. The swimmer has to dive in the water to avoid capture. • Two swimmers are chasing	15΄
	Swimmers climb on a boat (floating mat) with teacher's help. • When the teacher shouts "waves" swimmers leave the boat and go at the wall • When the teacher shouts "shark" they try to climb on the boat. Alternatively, the swimmer can stay still like the sea star, or ride the same tube with the teacher	15΄
Games	Take a tube and play the crashing game. Get on the horse and try to crash shoulder by shoulder (only with the teacher)	15΄
Discussion points	Which are the difficulties if you have to swim in a wavy sea?	
Safety	The depth has to be over 1,50 meters, and swimmers have to wear swimming belts	
Key words	Tarzan– Waves – Horses	

Lesson 9: Floating – Diving - Propulsion

Goal: Swimmers learn how to float and dive on their own.

Short presentation:

learn how to glide and breath to move easier in the water

Material:

swimming buoys, swimming tubes

Alternative activities:

Swimmers compare floatation in the pool and in the sea.

Contents	Exercises-organizing tips	Duration
Preparation – introduction	Swimmers sit at the edge of the pool. • The teachers ask them to lift one leg and show their toes in front • Do the same with the other leg • Repeat this move several times and in the end, they are making leg kicking Do the same in prone position with the edge just over the knee to keep the legs straight	10΄
	Put the tube under your arms and move like a dog • Keep your legs straight and relax at the surface of the water Alternatively, a hemiplegic swimmer could make a propel through sculling that could be functional and aid the swimmer to move forward. Push the wall in supine position to move away without kicking your legs. • Who can go further? • Return like a dog	10΄
Exercises floatation - diving	While floating on the water try to turn from prone to supine position • Use the swimming tube Put the swimming tube or the swimming buoy at your legs at supine position • Use left hand to turn left • Use right hand to turn right • Use both hands to move forward.	10΄

	Alternatively, we can use a swimming belt Do the same in prone position with the head in the water	
	Dive, while holding your breath. • The exercise doesn't need any assistance. • Ask swimmers to dive, count to 4 and get to the surface again • Do the same at prone and supine position Alternatively, children can explore the pool underwater with the teacher	10′
Recovery	Find the treasure Work is pairs • Rings are at the bottom of the pool. Alternatively, the rings can be held by the teacher. • The rings have different colors and point • Try to collect as more points by working together.	10′
Discussion points	Which position is easier to dive, Standing up, Prone, supine, and why?	
Safety	The depth has to be over 1,50 meters, and students have to wear swimming belts	
Key words	Push– Glide– Propulsion	

3. Swimming lessons designed for people with Physical injuries Disability (Tina Jeromen, Jana Čander)

Parts of a lesson plan:
A) Intro: Title, goals, short presentation, materials, alternative activities.

Lesson 1: Familiarization with the pool and with the water
Goal: developing trust **Short presentation:** Before going near the water, instructor works on developing the trust with students - by talking about their experiences with the water and what they would like to accomplish during the lesson.

Discover their motivation and present the water as a fun environment. Talk about the things they could do in water and about the new feelings and experiences. Develop interest in swimming and especially in “underwater world”.
Material:  set mats at the poolside, swimming noodles, boards, mixed toys.
Alternative activities:  discuss and reassure (if they are middle schoolers or adults) that it’s an essential skill and that it is not their fault that they did not learn to swim yet. Encourage them to tell their stories and early experience, so they feel relaxed. Help them feel safe in the water; if you can, find a quiet, private environment to teach, as novice swimmers may feel embarrassed that they don't yet know how to swim.

B) The contents: organized to objectives facilitating the general goal, with specific exercises and organizing tips as well as an indicative duration of every objective

Contents	Exercises-organizing tips	Duration
 **First contact with the water**	• warm up - walking/ pulling with the hands on the side of the pool and with help of the instructor • in the shallow part of the pool • Blowing bubbles on the water surface or blowing an object along • Throwing and catching a ball - the smallest of splashes from the softest of throws will be sufficient to have a positive effect.	15 ’
Familiarization with the water, getting the feel of the water	• Moving and pushing the swimming props with hands or feet (kick boards, noodles and similar) • Singing songs in a circle, playing games with ball or kick board.	10 ’
Play time and free time activities	Relaxing, doing things alone or with friends.	5 ’
Exit the pool	Walk to the showers, wash, and get dressed.	10’

C) Points to discuss, safety rules, key words

Proposals for the teachers of what to discuss and what pay attention regarding the safety of the children during the lessons.

Discussion points	Feelings, trusting, what is new, what they have experienced during the lesson.
Safety	Teach in pairs, 1teacher per 1 student. The teachers are always in the water with the swimmers.
Key words	Water, feeling the water, moving around the pool, discovering the feeling of the splash, hold a breath.

Lesson 2: Familiarization with the breathing, exhaling and splashes

Goal: developing trust

Short presentation:

talk about the goals for the lesson and describe the new experience with the water and holding the breath.

Material:

swimming props, different floating devices and fun toys.

Alternative activities:

reassure that it is an essential skill. Use a lot of different and playful exercises.

Contents	Exercises-organizing tips	Duration
First contact with the water	• Warm up - walking/ pulling with the hands on the side of the pool or move around the edges of the pool (shallow water) with the help of the instructor. • Everything is done in the shallow part of the pool	5’
	• Throwing, kicking, and catching a ball - the smallest of splashes from the softest of throws will be sufficient to have a positive effect.	10’

Partial submersion of the head	• Pushing or kicking the swimming props (kick boards, noodles and similar) • Blowing bubbles on the water surface or blowing an object along as you walk in the pool. • Cupping water in your own hands and throwing it onto your face and hair. • Throwing and catching, making splashes, kicking... • Searching for submerged objects: an object is placed just under the water surface, shallow enough to see and reach for it, but deep enough for the face to be submerged in order to reach it. Encourage to hold a breath each time for a little bit longer.	30 ′
Play time and free time activities	• Relaxing, doing things alone or with friends.	5 ′
Exit the pool	• Walk to the showers, wash, and get dressed.	10 ′
Discussion points	Feelings, trusting, what is new, what they have experienced during the lesson	
Safety	Teach in pairs, 1teacher per 1 student. The teachers are always in the water with the swimmers, most of the exercises are done 1 on 1.	
Key words	Water, feeling the water, discovering the feeling of the splash, partially submerge the head - the face, holding breath for 3 seconds.	

Lesson 3: Sinking – Floatation – Propulsion, submerging the head

Goal: submerge the head, breath holding

Short presentation:

getting the head underwater, taking and holding the breath.
A gradual approach is needed here.

Material:

swimming props, different floating devices and fun toys

Alternative activities:

discuss and reassure that it is a useful skill, be relaxed, teach relaxation. Teach the rhythm of inhales and exhales. Describe the ability of a person to hold a breath for some time, try it outside the pool.

Contents	Exercises-organizing tips	Duration
Submerge the head	• in the shallow part of the pool • jumping up and down (on one foot and both feet) • running from one side of the pool to another • crawling with shoulders underwater • play a game night/day • throwing, kicking, and catching the ball	15ʼ
	• reaching for the submerged object, it can be slightly lowered each time, to encourage the mouth and nose to be submerged.	15ʼ
Enjoying the underwater feeling	• pushing the swimming props (kick boards, noodles and similar) • singing songs in a circle • walking or crawling underneath a noodle placed at the surface of the water • putting a board on the top of the head and submerging the head so low, that the board is on the surface • play catch me with a noodle or similar with the help of the instructor, the only way to escape is by submerging under water	10ʼ
Play time and free time activities	Relaxing, doing things alone or with friends.	5ʼ
Exit the pool	• Walk to the showers, wash, and get dressed. • Encourage the same dressing routine.	10ʼ
Discussion points	Feelings, trusting, what is new, what they have experienced during the lesson	
Safety	Teach in pairs, 1teacher per student The teachers are always in the water with the swimmers. It is important to go slow and keep reinsuring the swimmers, that they are safe. Remember each swimmer will move at their own pace and try not rushing them.	
Key words	Water – feeling the water - discovering the feeling of the face underwater, breath holding.	

Lesson 4: Floating – Propulsion – Diving

Goal: to lie, to float on the surface of the water without the help of the instructor or props

Short presentation:

Discuss about the floating, describe the goal: to learn to keep the body floating on the water.

Material:

swimming props, different floating devices and fun toys.

Alternative activities:

finding the relaxed feeling in the water, jumps, running, floating while holding on the edge or with the help of the instructor.

Contents	Exercises-organizing tips	Duration
Floating on the water	• walking/ pulling with the hands on the side of the pool • in the shallow part of the pool • jumping up and down (on one foot and both feet) • running from one side of the pool to another • crawling with shoulders underwater • play a game night/day • finding the floating object and submerge under • encourage the mouth and nose to be submerged or the whole head.	15 ′
Enjoying the floating feeling	• playing different submerging games and games that encourage holding the breath for 5 -10 sec. • Front float: explain to the students that when they take a deep breath, their lungs fill with air and act as a floatation device (holding to the side of the pool) • take a deep breath and put their face in, so that only the back of their head is exposed. Slowly their legs will float toward the surface. • encourage them to stay in the position longer and longer, until they float 5-6 seconds. • make a circle where every second swimmer is floating and between them the swimmers are standing and holding the floaters, switch positions. • put a swimmer in the floating position, hold them below the neck, spin them slowly around	30 ′

Play time and free time activities	Relaxing, doing things alone or with friends.	5 '
Exit the pool	• Walk to the showers, wash and get dressed. • Encourage the same dressing routine.	10 '
Discussion points	Feelings, trusting, what is new, what they have experienced during the l esson	
Safety	Teach in pairs, 1teacher per 1 student The teachers are always in the water with the swimmers.	
Key words	Floating	

Lesson 5: Floating – Diving

Goal: glide and float on the surface of the water without the help of the instructor or props

Short presentation:

Learn to keep the body gliding on the water.

Material:

swimming props, different floating devices and fun toys.

Alternative activities:

finding the relaxed feeling in the water, floating while holding on the edge or with the help of the instructor

Contents	Exercises-organizing tips	Duration
Floating on the water	• warm up - walking/ pulling with the hands on the side of the pool and with help of the instructor • different games of submerging under props, hands ... • float in the water, with and without the help of the instructor, with or without props	15 '

Enjoying the floating	• playing different submerging games and games that encourage holding the breath for 5 sec. • Glide: swimmers take a breath; put their face in the water, place fingers of one hand over the fingers of the other, then push off the wall or from the bottom of the pool and float for 5-6 seconds. • Encourage them to stay in the position longer and longer • one swimmer goes into the floating position while the rest push him one by one in one direction • putting the arms in the position for floating, bending the knees and pushing in the air with legs to try to come out of the water • dolphin jumps	30 ′
Play time and free time activities	Relaxing, doing things alone or with friends.	5 ′
Exit the pool	• Walk to the showers, wash and get dressed. • Encourage the same dressing routine.	10 ′
Discussion points	Feelings, trusting, what is new, what they have experienced during the lesson	
Safety	Teach in pairs, 1teacher per student The teachers are always in the water with the swimmers.	
Key words	Water – floating, gliding.	

10 Additional water games for people with physical injuries disability

1. BIG BALL RACE: use an exceptionally large inflatable beach ball. See if kids can push the ball to the other side of the pool (no throwing, just push the ball)
2. PING PONG RACE: put 20 or so small ping-pong balls in the pool. Ask kids to collect as many as they can in a limited time.
3. ANIMAL NOISES: name one animal and get kids to make their best (ear-splitting) noises (dolphin, chihuahua, elephant ...)
4. SHARK AND PACK OF LITTLE TUNAS: one kid is a shark, waiting in the pool. Other kids are standing at the edge and on a mark, they jump in and try to escape past the shark to the other side.
5.HUNGRY FOX: one kid is a fox, others are chickens. Chicken asks the fox: "What time is it?" Fox picks a time and chickens make as many steps forward as is the number (5 o'clock - 5 steps). But if fox yells "Lunchtime!" Chickens have to escape from the fox not to be eaten.

6. DIVE FOR THE TREASURE: teacher throws small sinkable toys into the pool and kids have to dive in to find all. It can be different sizes, small coins, pebbles... or bigger - sticks, toys, big stones ...
7. NOODLE RACE: kids lie on their noodles (or any other big pool toy) and they race over to the other side of the pool, using just their legs, just one arm ...
8. AIR BALLON: the goal is to keep that balloon in the air as long as they can. Count how many times your group can go.
9. QUIZ MASTER: teacher stands in the water, each kid goes into a jump and just before they jump, the teacher asks a quiz question, for example: what the name of your dog is. The goal is to answer the question before the kid hits the water.
10. Water Relay. For this game, split the kids in two teams, give them a task which is suitable for their abilities and have some fun!

4. Swimming lessons designed for people with Down Syndrome

(Valeria Balan, Associate Professor PhD, Ana Maria Mujea, Lecturer PhD - Both authors have equally contributed to this chapter and should be considered as main authors)

Parts of a lesson plan:

A) Intro:

Title: **Accommodation and breathing**

Lesson 1: Accommodation and breathing
Goal: Teach the students to behave and move safely in the locker room and in the swimming pool: on the edge and in the water **Short presentation:** Discuss the value of the lesson and the behavior rules Practical application of the basic rules in the locker room Practical application of basic hygiene before entering the water and at the end of the swimming class Get to know the environment – locker room, edge of the pool and walls of the pool (in the water) Safety rules on the edge of the pool and in the water Practical exercises / games in the water
Material: Photos with the rules (it depends on the athletes' IQ or other functional / medical aspects)
Alternative activities: Identify which of the rules you follow at home Discuss why we need to learn swimming

B) The contents:

Organized to objectives facilitating the general goal, with specific exercises and organizing tips as well as an indicative duration of every objective

Contents	Exercises - organizing tips	Duration
 **Get to know – inform Use of the lockers**	Entry into the locker room / lockers: • Show them the places of the facility • Inform them about the rules applied in the locker room	5΄
 **Get to know – inform**	Gather at the meeting corner: • Inform them about the rules applied in the meeting corner	2΄
 **Get to know – inform Use of the shower**	Entry into the swimming pool - the place where they sit and leave their towels and start informing them - the space around the pool -warm up - shower: • Go together with them • Show them the places of the facility • Show them how to get undressed in the swimming pool • Practice the physical exercises - warm up • Create a routine for the shower	10΄
 **First experience with the pool**	Knowing the edge of the pool: • Sit together on the edge of the swimming pool and touch the water • Show them the place where they enter the water • Walk towards the pool slowly and carefully	5΄
 **Accommodation with the water**	Entry into the water and accommodation: • Entry into the water – demonstration and practice together • Walk through the water • Accommodation with the wet face and body • Ask them to do the exercise by showing them/ without showing them how Additional activities: 1. Sit on the edge of the swimming pool and hit the water with your hands 2. Sit on the edge of the swimming pool and kick the water with your feet	20΄

 **Exit the pool – dress**	Exit from the water - shower - wash - get dressed • Create a routine for exiting the water • Create a routine for the shower • Create a routine for dressing	8 ’

C) Points to discuss, safety rules, key words

Proposals for the teachers of what to discuss and pay attention regarding the safety of the children during the lessons

 **Discussion points**	When are we in danger within the facility? Why is it important to have a shower before and after the lesson? Why is it important to respect the rules on the edge of the swimming pool and in the water? Why is it important to repeat the specific technical exercises?
 **Safety**	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers The coach / volunteer(s) shows / show all the exercises
 **Key words**	Water – hygiene – shower – dressing

Lesson 2: Accommodation and breathing
 **Goal:** Remember the previously learnt structure. Learning to the specific breathing **Short presentation:**  Basic rules in the locker room, safety rules on the edge of the pool and in the water and basic hygiene rules Practical exercises / games in the water
Material:  Balls. Floating devices. Fun toys
Alternative activities:  Use different exercises and games (depending on the age of the athletes)

Contents	Exercises - organizing tips	Duration
Warm up	Entry into the water and accommodation: • Sit together on the edge of the swimming pool and touch the water • Walk towards the pool slowly and carefully • Walk through the water • Accommodation with the wet body	10 ′
Specific breathing	• Blowing the water – demonstration and practice together • Blowing the ball on the surface of the water • Blowing bubbles – demonstration and practice together • Blowing bubbles at the wall • Blowing bubbles in different combinations and games Additional activities: 1. Sit on the edge of the swimming pool with the coach splashing you with water 2. Walk through the water and blow the water with your hands	30 ′
 **Play time**	• Doing things alone or with a coach / volunteers / athletes	5 ′
Exit the pool	• Exit from the water • Shower	5 ′
Discussion points	The athletes' experiences in the water The athletes' favorite exercises and activities	
Safety	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers The coach / volunteer(s) shows / show all the exercises	
Key words	Water – hygiene – shower – dressing – specific breathing	

Lesson 3: Accommodation and floating

Goal: Remember the previously learnt structure. Consolidate to the specific breathing. Learning the floating.

Short presentation:

Basic rules in the locker room, safety rules on the edge of the pool and in the water and basic hygiene rules.
Front float.
Practical exercises / games in the water

Material:

Balls. Floating devices. Fun toys

Alternative activities:

Use different exercises and games (depending on the age of the athletes)

Contents	Exercises - organizing tips	Duration
Warm up	Entry into the water and accommodation: • Sit together on the edge of the swimming pool and touch the water • Walk towards the pool slowly and carefully • Walk through the water • Accommodation with the wet body and face	10 ′
Specific breathing Floating	• Blowing bubbles in different combinations and games • Front float – demonstration and practice together • Front float at the wall – using different devices • Front float with the help of a coach / volunteer – using different devices • Front float in different combinations and games Additional activities: • Front float with two partners • Front float with a partner and putting one's hands on the ladder of the pool	30 ′
Play time	• Doing things alone or with a coach / volunteers / athletes	5 ′

Exit the pool	• Exit from the water • Shower	5’
Discussion points	The athletes’ experiences in the water The athletes’ favorite exercises and activities	
Safety	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers The coach / volunteer(s) shows / show all the exercises	
Key words	Water – specific breathing – floating	

Lesson 4: Accommodation and floating

Goal: Remember the previously learnt structure. Consolidate to the specific breathing. Learning the floating.

Short presentation:

Basic rules in the locker room, safety rules on the edge of the pool and in the water and basic hygiene rules. Front float. Practical exercises / games in the water

Material:

Balls. Floating devices. Fun toys

Alternative activities:

Use different exercises and games (depending on the age of the athletes)

Contents	Exercises - organizing tips	Duration
Warm up	Entry into the water and accommodation: • Sit together on the edge of the swimming pool and touch the water • Walk towards the pool slowly and carefully • Walk through the water • Accommodation with the wet body and face	10’
Specific breathing Floating	• Blowing bubbles in different combinations and games • Front float – demonstration and practice together	30’

	• Front float at the wall – using different devices • Front float with the help of a coach / volunteer – using different devices • Front float in different combinations and games Additional activities: • Front float with two partners • Front float with a partner and putting one's hands on the ladder of the pool	
 **Play time**	• Doing things alone or with a coach / volunteers / athletes	5 '
Exit the pool	• Exit from the water • Shower	5 '
 **Discussion points**	The athletes' experiences in the water The athletes' favorite exercises and activities	
 **Safety**	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers The coach / volunteer(s) shows / show all the exercises	
 **Key words**	Water – specific breathing – floating	

Lesson 5: Accommodation and floating

 **Goal:** Remember the previously learnt structure. Consolidate to the specific breathing. Learning the floating.

Short presentation: 

Basic rules in the locker room, safety rules on the edge of the pool and in the water and basic hygiene rules. Back float. Practical exercises / games in the water

Material: 

Balls. Floating devices. Fun toys

Alternative activities: 

Use different exercises and games (depending on the age of the athletes)

Contents	Exercises - organizing tips	Duration
Warm up	Entry into the water and accommodation: • Sit together on the edge of the swimming pool and touch the water • Walk towards the pool slowly and carefully • Walk through the water • Accommodation with the wet body and face	10 ′
Specific breathing Floating	• Blowing bubbles in different combinations and games • Back float – demonstration and practice together • Back float at the wall – using different devices • Back float with the help of a coach / volunteer – using different devices • Back float in different combinations and games Additional activities: • Back float with two partners • Back float with a partner and putting one's hands on the ladder of the pool	30 ′
 **Play time**	• Doing things alone or with a coach / volunteers / athletes	5 ′
Exit the pool	• Exit from the water • Shower	5 ′
 **Discussion points**	The athletes' experiences in the water The athletes' favorite exercises and activities	
 **Safety**	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers. The coach / volunteer(s) shows / show all the exercises	
 **Key words**	Water – specific breathing – floating	

Lesson 6: Accommodation and floating

Goal: Remember the previously learnt structure. Consolidate to the specific breathing. Learning the floating.

Short presentation:

Basic rules in the locker room, safety rules on the edge of the pool and in the water and basic hygiene rules. Back float. Practical exercises / games in the water

Material:

Balls. Floating devices. Fun toys

Alternative activities:

Use different exercises and games (depending on the age of the athletes)

Contents	Exercises - organizing tips	Duration
Warm up	Entry into the water and accommodation: • Sit together on the edge of the swimming pool and touch the water • Walk towards the pool slowly and carefully • Walk through the water • Accommodation with the wet body and face	10 ′
Specific breathing Floating	• Blowing bubbles in different combinations and games • Back float – demonstration and practice together • Back float at the wall – using different devices • Back float with the help of a coach / volunteer – using different devices • Back float in different combinations and games Additional activities: • Back float with two partners • Back float with a partner and putting one's hands on the ladder of the pool	30 ′
Play time	• Doing things alone or with a coach / volunteers / athletes	5 ′
Exit the pool	• Exit from the water • Shower	5 ′

Discussion points	The athletes' experiences in the water The athletes' favorite exercises and activities
Safety	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers. The coach / volunteer(s) shows / show all the exercises
Key words	Water – specific breathing – floating

Lesson 7: Accommodation and floating		
Goal: Consolidate to the specific breathing. Consolidate to the floating (front and back) **Short presentation:** Basic rules in the locker room, safety rules on the edge of the pool and in the water and basic hygiene rules. Front float and back float. Practical exercises / games in the water		
Material: Balls. Floating devices. Fun toys		
Alternative activities: Use different exercises and games (depending on the age of the athletes)		
Contents	**Exercises - organizing tips**	**Duration**
Warm up	Entry into the water and accommodation: • Sit together on the edge of the swimming pool and touch the water • Walk towards the pool slowly and carefully • Walk through the water • Accommodation with the wet body and face • Different exercises and games that the athletes prefer	15 '
Consolidate to the specific breathing Consolidate to the floating	• Blowing bubbles in different combinations and games • Front float in different combinations and games • Back float in different combinations and games	25 '

	Additional activities - games: • Front jellyfish (front float with the arms and legs away from the body) • Back jellyfish (back float with the arms and legs away from the body) • Bridge – walk through the water; when arriving near a floating device, the athlete dives, blows and comes to the surface of the water	
Play time	• Doing things alone or with a coach / volunteers / athletes	5 '
Exit the pool	• Exit from the water • Shower	5 '
Discussion points	The athletes' experiences in the water The athletes' favorite exercises and activities	
Safety	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers. The coach / volunteer(s) shows / show all the exercises	
Key words	Water – specific breathing – floating	

Lesson 8: Accommodation and floating
Goal: Consolidate to the specific breathing. Consolidate to the floating (front and back)
Short presentation: Basic rules in the locker room, safety rules on the edge of the pool and in the water and basic hygiene rules. Front float and back float. Practical exercises / games in the water
Material: Balls. Floating devices. Fun toys
Alternative activities: Use different exercises and games (depending on the age of the athletes)

Contents	Exercises - organizing tips	Duration
Warm up	Entry into the water and accommodation: • Sit together on the edge of the swimming pool and touch the water • Walk towards the pool slowly and carefully • Walk through the water • Accommodation with the wet body and face • Different exercises and games that the athletes prefer	15 ′
Consolidate to the specific breathing Consolidate to the floating	• Blowing bubbles in different combinations and games • Front float in different combinations and games • Back float in different combinations and games Additional activities - games: • Front jellyfish (front float with the arms and legs away from the body) • Back jellyfish (back float with the arms and legs away from the body) • Bridge – walk through the water; when arriving near a floating device, the athlete dives, blows and comes to the surface of the water	25 ′
 **Play time**	• Doing things alone or with a coach / volunteers / athletes	5 ′
Exit the pool	• Exit the water • Shower	5 ′
 **Discussion points**	The athletes' experiences in the water The athletes' favorite exercises and activities	
 **Safety**	The analogy is 1/1 The coach / volunteer(s) is/are always in the water with the swimmers The coach / volunteer(s) shows / show all the exercises	
 **Key words**	Water – specific breathing – floating	

Lesson 9: Propelling

Goal: Learning the kick on front

Short presentation:

Kick on front . Practical exercises / games in the water

Material:

Kickboard. Floating devices. Fins

Alternative activities:

Use different exercises and games (depending on the age of the athletes)
Use different swimming devices (depending on each athlete)

Contents	Exercises - organizing tips	Duration
Warm up	• Accommodation with the wet body and face • Different exercises and games so that the athlete consolidates their specific breathing, floating and gliding	10΄
Learning the kick on the front	• Kick on front with the hands on the wall – demonstration and practice together • The coach / volunteer assists the athlete and demonstrates whenever necessary • The fins can be used – to learn the correct drill • A floating device or floating devices is / are used depending on the athlete Additional activities: • Kick on front with the hands on a partner – the partner pulls the athlete through the water (floating devices can be used) • Kick on front with the hands on a kickboard – a partner pulls the athlete through the water (floating devices can be used)	30΄
Play time	• Doing things alone or with a coach / volunteers / athletes	5΄
Exit the pool	• Exit the water • Shower	5΄

Discussion points	The athletes' experiences in the water The athletes' favorite exercises and activities
Safety	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers The coach / volunteer(s) shows / show all the exercises
Key words	Water – kick on front

Lesson 10: Propelling

Goal: Learning the kick on front

Short presentation:

Kick on front. Practical exercises / games in the water

Material:

Kickboard. Floating devices. Fins

Alternative activities:

Use different exercises and games (depending on the age of the athletes)
Use different swimming devices (depending on each athlete)

Contents	Exercises - organizing tips	Duration
Warm up	• Accommodation with the wet body and face • Different exercises and games so that the athlete consolidates their specific breathing, floating and gliding	10 '
Learning the kick on front	• Kick on front with the hands on the wall – demonstration and practice together • Kick on front with the hands on a kickboard – demonstration and practice together • Kick on front with the hands on a kickboard from one wall to the opposite wall of the swimming pool • The coach / volunteer assists the athlete and demonstrates whenever necessary • The fins can be used – to learn the correct drill	30 '

	• A floating device or floating devices is / are used depending on the athlete Additional activities: • Kick on front with the hands on a partner – the partner pulls the athlete through the water (floating devices can be used) • Kick on front with the hands on a kickboard – a partner pulls the athlete through the water (floating devices can be used)	
 **Play time**	• Doing things alone or with a coach / volunteers / athletes	5 ’
Exit the pool	• Exit the water • Shower	5 ’
 **Discussion points**	The athletes’ experiences in the water The athletes’ favorite exercises and activities	
 **Safety**	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers. The coach / volunteer(s) shows / show all the exercises	
 **Key words**	Water – kick on front	

Lesson 11: Propelling
 **Goal:** Learning the kick on front
Short presentation:  Kick on front. Practical exercises in the water
Material:  Kickboard. Floating devices. Fins.
Alternative activities:  Use different exercises and games (depending on the age of the athletes). Use different swimming devices (depending on each athlet).

Contents	Exercises - organizing tips	Duration
Warm up	• Accommodation with the wet body and face • Different exercises and games so that the athlete consolidates their specific breathing, floating and gliding	10 ′
Learning the kick on the front	• Kick on front with the hands on the wall (demonstration if necessary) • Kick on front with the hands on a kickboard over different distances • Blowing bubbles after a race (it is very useful for the consolidation of specific breathing and for relaxation) • The coach / volunteer assists the athlete in the water only if necessary • The floating device can be eliminated if the athlete has learnt to press the water correctly Additional activities – games: • Rolling band – the partner / volunteers are in a line (1 m between them) and pull the athlete through the water • Cart – the partner pulls the athlete through the water	30 ′
 **Play time**	• Doing things alone or with a coach / volunteers / athletes	5 ′
Exit the pool	• Exit the water • Shower	5 ′
 **Discussion points**	The athletes' experiences in the water The athletes' favorite exercises and activities	
 **Safety**	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers. The coach / volunteer(s) shows / show all the exercises	
 **Key words**	Water – kick on front	

Lesson 12: Propelling

Goal: Learning the kick on front

Short presentation:

Kick on front. Practical exercises in the water

Material:

Kickboard. Floating devices.. Fins

Alternative activities:

Use different exercises and games (depending on the age of the athletes). Use different swimming devices (depending on each athlete)

Contents	Exercises - organizing tips	Duration
Warm up	• Accommodation with the wet body and face • Different exercises and games so that the athlete consolidates their specific breathing, floating and gliding	10 '
Learning the kick on the front	• Kick on front with the hands on the wall (demonstration if necessary) • Kick on front with the hands on a kickboard over different distances • Blowing bubbles after a race (it is very useful for the consolidation of specific breathing and for relaxation) • The coach / volunteer assists the athlete in the water only if necessary • The floating device can be eliminated if the athlete has learnt to press the water correctly Additional activities – games: • Rolling band – the partner / volunteers are in a line (1 m between them) and pull the athlete through the water • Cart – the partner pulls the athlete through the water	30 '
Play time	• Doing things alone or with a coach / volunteers / athletes	5 '
Exit the pool	• Exit the water • Shower	5 '

Discussion points	The athletes' experiences in the water The athletes' favorite exercises and activities
Safety	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers. The coach / volunteer(s) shows / show all the exercises
Key words	Water – kick on front

Lesson 13: Propelling

Goal: Learning the kick on back

Short presentation:

Kick on back. Practical exercises in the water

Material:

Kickboard. Floating devices. Fins

Alternative activities:

Use different exercises and games (depending on the age of the athletes). Use different swimming devices (depending on each athlete)

Contents	Exercises-organizing tips	Duration
Warm up	• Accommodation with the wet body and face	5 ′
Learning the kick on the back	• Kick on back with the hands on the wall – demonstration and practice together • Kick on back with the hands on a kickboard – demonstration and practice together • The coach / volunteer assists the athlete and demonstrates whenever necessary • The fins can be used – to learn the correct drill • A floating device or floating devices is / are used depending on the athlete • Kick on front with the hands on a kickboard over different distances	35 ′

	Additional activities: • Kick on back with the hands on a partner – the partner pulls the athlete through the water (floating devices can be used) • Kick on back with the hands on a kickboard – a partner pulls the athlete through the water (floating devices can be used)	
 **Play time**	• Doing things alone or with a coach / volunteers / athletes	5 ′
Exit the pool	• Exit from the water • Shower	5 ′
 **Discussion points**	The athletes' experiences in the water The athletes' favorite exercises and activities	
 **Safety**	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers. The coach / volunteer(s) shows / show all the exercises	
 **Key words**	Water – kick on front – kick on back	

Lesson 14: Propelling
 **Goal:** Learning the kick on back
Short presentation:  Kick on back. Practical exercises in the water
Material:  Kickboard. Floating devices. Fins
Alternative activities:  Use different exercises and games (depending on the age of the athletes) Use different swimming devices (depending on each athlete)

Contents	Exercises - organizing tips	Duration
Warm up	• Accommodation with the wet body and face	5 ′
Learning the kick on back	• Kick on back with the hands on the wall – demonstration and practice together • Kick on back with the hands on a kickboard – demonstration and practice together • The coach / volunteer assists the athlete and demonstrates whenever necessary • The fins can be used – to learn the correct drill • A floating device or floating devices is / are used depending on the athlete • Kick on back with the hands on a kickboard over different distances Additional activities: • Kick on back with the hands on a partner – the partner pulls the athlete through the water (floating devices can be used) • Kick on back with the hands on a kickboard – a partner pulls the athlete through the water (floating devices can be used)	35 ′
Play time	• Doing things alone or with a coach / volunteers / athletes	5 ′
Exit the pool	• Exit the water • Shower	5 ′
Discussion points	The athletes' experiences in the water The athletes' favorite exercises and activities	
Safety	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers. The coach / volunteer(s) shows / show all the exercises	
Key words	Water – kick on front – kick on back	

Lesson 15: Propelling

Goal: Learning the kick on back

Short presentation:

Kick on back. Practical exercises in the water

Material:

Kickboard. Floating devices. Fins

Alternative activities:

Use different exercises and games (depending on the age of the athletes). Use different swimming devices (depending on each athlete)

Contents	Exercises - organizing tips	Duration
Warm up	• Accommodation with the wet body and face	5΄
Learning the kick on back	• Kick on back with the hands on the wall (demonstration if necessary) • Kick on back with the hands on a kickboard • The coach / volunteer assists the athlete and demonstrates whenever necessary • A floating device or floating devices is / are used depending on the athlete • Kick on front with the hands on a kickboard over different distances Additional activities – games: • Rolling band – the partner / volunteers are in a line (1 m between them) and pull the athlete through the water • Cart – the partner pulls the athlete through the water	35΄
Play time	• Doing things alone or with a coach / volunteers / athletes	5΄
Exit the pool	• Exit the water • Shower	5΄
Discussion points	The athletes' experiences in the water The athletes' favorite exercises and activities	

Safety	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers. The coach / volunteer(s) shows / show all the exercises
Key words	Water – kick on front – kick on back

Lesson 16: Propelling

Goal: Learning the kick on back

Short presentation:

Kick on back. Practical exercises in the water.

Material:

Kickboard. Floating devices. Fins

Alternative activities:

Use different exercises and games (depending on the age of the athletes). Use different swimming devices (depending on each athlete)

Contents	Exercises - organizing tips	Duration
Warm up	• Accommodation with the wet body and face	5′
Learning the kick on front	• Kick on front with the hands on the wall (demonstration if necessary) • Kick on front with the hands on a kickboard • The coach / volunteer assists the athlete and demonstrates whenever necessary • A floating device or floating devices is / are used depending on the athlete • Kick on front with the hands on a kickboard over different distances Additional activities – games: • Rolling band – the partner / volunteers are in a line (1 m between them) and pull the athlete through the water • Cart – the partner pulls the athlete through the water	30′

Play time	• Doing things alone or with a coach / volunteers / athletes	5 ’
Exit the pool	• Exit the water • Shower	5 ’
Discussion points	The athletes’ experiences in the water The athletes’ favorite exercises and activities	
Safety	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers. The coach / volunteer(s) shows / show all the exercises	
Key words	Water – kick on front – kick on back	

Severe intellectual disability – IQ under 50

A) Intro:

Title: **Accommodation**

Lesson 1: Accommodation

Goal: Teach the students to behave and move safely in the locker room and in the swimming pool: on the edge and in the water

Short presentation:

Discuss the value of the lesson and the behavior rules. Practical application of the basic rules in the locker room. Practical application of basic hygiene before entering the water and at the end of the swimming class. Get to know the environment – locker room, edge of the swimming pool and walls of the pool (in the water). Safety rules on the edge of the pool and in the water. Practical exercises on the edge of the pool and in the water.

Material:

Photos with the rules (it depends on the athletes’ IQ or other functional / medical aspects). Bathroom – water sink.

Alternative activities

Identify which of the rules you follow at home. Discuss why we need to learn swimming. Movements of the hands and feet in the water

B) The contents:

Organized to objectives facilitating the general goal, with specific exercises and organizing tips as well as an indicative duration of every objective

Contents	Exercises - organizing tips	Duration
 **Get to know – inform Use of the lockers**	Entry into the locker room / lockers: • Show them the places of the facility • Inform them about the rules applied in the locker room	8΄
 **Get to know – inform**	Gather at the meeting corner: • Inform them about the rules applied in the meeting corner	5΄
 **Get to know – inform Use of the shower**	Entry into the swimming pool - the place where they sit and leave their towels and start informing them - the space around the pool -warm up - shower: • Go together with them • Show them the places of the facility • Show them how to get undressed in the swimming pool • Practice the physical exercises – warm up • Create a routine for the shower	10΄
 **First experience with the pool**	Knowing the edge of the pool: • Sit together on the edge of the swimming pool and touch the water • Show them the place where they enter the water • Walk towards the pool slowly and carefully	5΄
 **Accommodation with the water**	Entry into the water and accommodation: • Entry into the water – demonstration and practice together • Walk together through the water • Accommodation with the wet body • Ask them to do the exercise by showing them how Additional activities: • Sit on the edge of the swimming pool and blow the water with your hands • Sit on the edge of the swimming pool and kick the water with your feet	12΄

Exit the pool – dress	Exit from the water - shower - wash - get dressed • Create a routine for exiting from the water • Create a routine for the shower • Create a routine for dressing	10 ′

C) Points to discuss, safety rules, key words

Proposals for the teachers of what to discuss and pay attention regarding the safety of the children during the lessons

Discussion points	When are we in danger within the facility? Why is it important to have a shower before and after the lesson? Why is it important to respect the rules on the edge of the swimming pool and in the water? Why is it important to repeat the specific technical exercises?
Safety	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers. The coach / volunteer(s) shows / show all the exercises
Key words	Water – hygiene – shower – dressing

Lesson 2: Accommodation
Goal: Teach the students to behave and move safely in the locker room and in the swimming pool: on the edge and in the water
Short presentation: Discuss the value of the lesson and the behavior rules. Practical application of the basic rules in the locker room. Practical application of basic hygiene before entering the water and at the end of the swimming class. Get to know the environment – locker room, edge of the swimming pool and walls of the pool (in the water). Safety rules on the edge of the pool and in the water. Practical exercises on the edge of the pool and in the water.
Material: Photos with the rules (it depends on the athletes' IQ or other functional / medical aspects) Bathroom – water sink

Alternative activities:

Identify which of the rules you follow at home. Discuss why we need to learn swimming. Movements of the hands and feet in the water

Contents	Exercises - organizing tips	Duration
Get to know – inform Use of the lockers	Entry into the locker room / lockers: • Show them the places of the facility • Inform them about the rules applied in the locker room	8΄
Get to know – inform	Gather at the meeting corner: • Inform them about the rules applied in the meeting corner	5΄
Get to know – inform Use of the shower	Entry into the swimming pool - the place where they sit and leave their towels and start informing them - the space around the pool -warm up - shower: • Go together with them • Show them the places of the facility • Show them how to get undressed in the swimming pool • Practice the physical exercises – warm up • Create a routine for the shower	10΄
First experience with the pool	Knowing the edge of the pool: • Sit together on the edge of the swimming pool and touch the water • Show them the place where they enter the water • Walk towards the pool slowly and carefully	5΄
Accommodation with the water	Entry into the water and accommodation: • Entry into the water – demonstration and practice together • Walk together through the water • Accommodation with the wet body • Ask them to do the exercise by showing them how Additional activities: • Sit on the edge of the swimming pool and blow the water with your hands • Sit on the edge of the swimming pool and kick the water with your feet	12΄

Exit the pool – dress	Exit from the water - shower - wash - get dressed • Create a routine for exiting from the water • Create a routine for the shower • Create a routine for dressing	10 ’
Discussion points	When are we in danger within the facility? Why is it important to have a shower before and after the lesson? Why is it important to respect the rules on the edge of the swimming pool and in the water? Why is it important to repeat the specific technical exercises?	
Safety	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers. The coach / volunteer(s) shows / show all the exercises	
Key words	Water – hygiene – shower – dressing	

Lesson 3: Accommodation and breathing

Goal: Remember the previously learnt structure. Learning to the specific breathing

Short presentation:

Basic rules in the locker room, safety rules on the edge of the pool and in the water and basic hygiene rules. Practical exercises / games in the water

Material:

Balls. Floating devices. Fun toys

Alternative activities:

Use different exercises and games (depending on the age of the athletes)

Contents	Exercises - organizing tips	Duration
Warm up	Entry into the water and accommodation: • Sit together on the edge of the swimming pool and touch the water • Walk towards the pool slowly and carefully	10 ’

	• Walk through the water • Accommodation with the wet body	
Accommodation **Specific breathing**	• Blowing the water – demonstration and practice together • Blowing the ball on the surface of the water • Blowing bubbles – demonstration and practice together • Blowing bubbles at the wall • Blowing bubbles in different combinations and games Additional activities: • Sit on the edge of the swimming pool with the coach splashing you with water • Walk through the water and blow the water with your hands	30 ′
 **Play time**	• Doing things alone or with a coach / volunteers / athletes	5 ′
Exit the pool	• Exit the water • Shower	5 ′
 **Discussion points**	The athletes' experiences in the water The athletes' favorite exercises and activities	
 **Safety**	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers. The coach / volunteer(s) shows / show all the exercises	
 **Key words**	Water – hygiene – shower – dressing – specific breathing	

Lesson 4: Accommodation and breathing

Goal: Remember the previously learnt structure. Learning to the specific breathing

Short presentation:

Basic rules in the locker room, safety rules on the edge of the pool and in the water and basic hygiene rules. Practical exercises / games in the water

Material:

Balls. Floating devices. Fun toys

Alternative activities:

Use different exercises and games (depending on the age of the athletes)

Contents	Exercises-organizing tips	Duration
Warm up	Entry into the water and accommodation: • Sit together on the edge of the swimming pool and touch the water • Walk towards the pool slowly and carefully • Walk through the water • Accommodation with the wet body	10΄
Accommodation Specific breathing	• Blowing the water – demonstration and practice together • Blowing the ball on the surface of the water • Blowing bubbles – demonstration and practice together • Blowing bubbles at the wall • Blowing bubbles in different combinations and games Additional activities: • Sit on the edge of the swimming pool with the coach splashing you with water • Walk through the water and blow the water with your hands	30΄
Play time	• Doing things alone or with a coach / volunteers / athletes	5΄
Exit the pool	• Exit the water • Shower	5΄

Discussion points	The athletes' experiences in the water The athletes' favorite exercises and activities
Safety	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers. The coach / volunteer(s) shows / show all the exercises
Key words	Water – hygiene – shower – dressing – specific breathing

Lesson 5: Breathing and floating

Goal: Remember the previously learnt structure. Consolidate to the specific breathing. Learning the floating

Short presentation:

Basic rules in the locker room, safety rules on the edge of the pool and in the water and basic hygiene rules. Front float

Material:

Balls. Floating devices. Fun toys

Alternative activities:

Use different exercises and games (depending on the age and abilities of the athletes)

Contents	Exercises - organizing tips	Duration
Warm up	Entry into the water and accommodation: • Sit together on the edge of the swimming pool and touch the water • Walk towards the pool slowly and carefully • Walk through the water • Accommodation with the wet body and face	10 ′
Breathing Floating	• Blowing bubbles in different combinations and games • Front float – demonstration and practice together • Front float at the wall – using different devices • Front float with the help of a coach / volunteer – using different devices	30 ′

	Additional activities: • Front float with two partners • Front float with a partner and putting one's hands on the ladder of the pool	
 **Play time**	• Doing things with a coach or volunteer(s)	5 ′
Exit the pool	• Exit the water • Shower	5 ′
 **Discussion points**	The athletes' experiences in the water The athletes' favorite exercises and activities	
 **Safety**	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers The coach / volunteer(s) shows / show all the exercises	
 **Key words**	Water – specific breathing – floating	

Lesson 6: Breathing and floating		
 **Goal:** Remember the previously learnt structure. Consolidate to the specific breathing. Learning the floating **Short presentation:**  Basic rules in the locker room, safety rules on the edge of the pool and in the water and basic hygiene rules. Front float. Practical exercises / games in the water		
Material:  Balls. Floating devices. Fun toys		
Alternative activities:  Use different exercises and games (depending on the age and abilities of the athletes)		
Contents	**Exercises - organizing tips**	**Duration**
Warm up	Entry into the water and accommodation: • Sit together on the edge of the swimming pool and touch the water	10 ′

	• Walk towards the pool slowly and carefully • Walk through the water • Accommodation with the wet body and face	
Breathing Floating	• Blowing bubbles in different combinations and games • Front float – demonstration and practice together • Front float at the wall – using different devices • Front float with the help of a coach / volunteer – using different devices Additional activities: • Front float with two partners • Front float with a partner and putting one's hands on the ladder of the pool	30 ′
 **Play time**	• Doing things with a coach or volunteer(s)	5 ′
Exit the pool	• Exit the water • Shower	5 ′
 **Discussion points**	The athletes' experiences in the water The athletes' favorite exercises and activities	
 **Safety**	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers The coach / volunteer(s) shows / show all the exercises	
 **Key words**	Water – specific breathing – floating	

Lesson 7: Breathing and floating

 **Goal:** Remember the previously learnt structure. Consolidate to the specific breathing. Learning the floating

Short presentation: 

Basic rules in the locker room, safety rules on the edge of the pool and in the water and basic hygiene rules. Back float

Material: 

Balls. Floating devices. Fun toys

Alternative activities: 

Use different exercises and games (depending on the age and abilities of the athletes)

Contents	Exercises - organizing tips	Duration
Warm up	Entry into the water and accommodation: • Sit together on the edge of the swimming pool and touch the water • Walk towards the pool slowly and carefully • Walk through the water • Accommodation with the wet body and face	10΄
Breathing Floating	• Blowing bubbles in different combinations and games • Back float – demonstration and practice together • Back float at the wall – using different devices • Back float with the help of a coach / volunteer – using different devices Additional activities: • Back float with two partners • Back float with a partner and putting one's hands on the ladder of the pool	30΄
 **Play time**	• Doing things with a coach or volunteer(s)	5΄
Exit the pool	• Exit the water • Shower	5΄
 **Discussion points**	The athletes' experiences in the water The athletes' favorite exercises and activities	
 **Safety**	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers. The coach / volunteer(s) shows / show all the exercises	
 **Key words**	Water – specific breathing – floating	

Lesson 8: Breathing and floating

Goal: Remember the previously learnt structure. Consolidate to the specific breathing. Learning the floating

Short presentation:

Basic rules in the locker room, safety rules on the edge of the pool and in the water and basic hygiene rules. Back float

Material:

Balls. Floating devices. Fun toys

Alternative activities:

Use different exercises and games (depending on the age and abilities of the athletes)

Contents	Exercises - organizing tips	Duration
Warm up	Entry into the water and accommodation: • Sit together on the edge of the swimming pool and touch the water • Walk towards the pool slowly and carefully • Walk through the water • Accommodation with the wet body and face	10 ′
Breathing Floating	• Blowing bubbles in different combinations and games • Back float – demonstration and practice together • Back float at the wall – using different devices • Back float with the help of a coach / volunteer – using different devices Additional activities: • Back float with two partners • Back float with a partner and putting one's hands on the ladder of the pool	30 ′
 **Play time**	• Doing things with a coach or volunteer(s)	5 ′
Exit the pool	• Exit the water • Shower	5 ′

Discussion points	The athletes' experiences in the water The athletes' favorite exercises and activities
Safety	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers. The coach / volunteer(s) shows / show all the exercises

Lesson 9: Accommodation, breathing and floating

Goal: Consolidate to the specific breathing. Consolidate to the floating (front and back)

Short presentation:

Basic rules in the locker room, safety rules on the edge of the pool and in the water and basic hygiene rules. Accommodation and breathing. Front float and back float. Practical exercises / games in the water

Material:

Balls. Floating devices. Fun toys

Alternative activities:

Use different exercises and games (depending on the age and abilities of the athletes)

Contents	Exercises - organizing tips	Duration
Warm up	Entry into the water and accommodation: • Sit together on the edge of the swimming pool and touch the water • Walk towards the pool slowly and carefully • Walk through the water • Accommodation with the wet body and face • Different exercises and games that the athletes prefer	15΄
Consolidate to the breathing **Consolidate to the floating**	• Blowing bubbles in different combinations and games • Front float in different combinations and games • Back float in different combinations and games	25΄

	Additional activities - games: • Front jellyfish (front float with the arms and legs away from the body) • Back jellyfish (back float with the arms and legs away from the body) • Bridge – walk through the water; when arriving near a floating device, the athlete dives, blows and comes to the surface of the water	
 **Play time**	• Doing things alone or with a coach / volunteer(s)	5 ′
Exit the pool	• Exit the water • Shower	5 ′
 **Discussion points**	The athletes' experiences in the water The athletes' favorite exercises and activities	
 **Safety**	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers. The coach / volunteer(s) shows / show all the exercises	
 **Key words**	Water – specific breathing – floating	

Lesson 10: Accommodation, breathing and floating

Goal: Consolidate to the specific breathing. Consolidate to the floating (front and back)

Short presentation: 

Basic rules in the locker room, safety rules on the edge of the pool and in the water and basic hygiene rules. Accommodation and breathing. Front float and back float Practical exercises / games in the water

Material: 

Balls. Floating devices. Fun toys

Alternative activities: 

Use different exercises and games (depending on the age and abilities of the athletes)

Contents	Exercises - organizing tips	Duration
Warm up	Entry into the water and accommodation: • Sit together on the edge of the swimming pool and touch the water • Walk towards the pool slowly and carefully • Walk through the water • Accommodation with the wet body and face • Different exercises and games that the athletes prefer	15 ′
Consolidate to the breathing **Consolidate to the floating**	• Blowing bubbles in different combinations and games • Front float in different combinations and games • Back float in different combinations and games Additional activities - games: • Front jellyfish (front float with the arms and legs away from the body) • Back jellyfish (back float with the arms and legs away from the body) • Bridge – walk through the water; when arriving near a floating device, the athlete dives, blows and comes to the surface of the water	25 ′
 **Play time**	• Doing things alone or with a coach / volunteer(s)	5 ′
Exit the pool	• Exit the water • Shower	5 ′
 **Discussion points**	The athletes' experiences in the water The athletes' favorite exercises and activities	
 **Safety**	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers. The coach / volunteer(s) shows / show all the exercises	
 **Key words**	Water – specific breathing – floating	

Lesson 11: Propelling

Goal: Learning the kick on front

Short presentation:

Kick on front. Practical exercises / games in the water

Material:

Kickboard. Floating devices. Fins

Alternative activities:

Use different exercises and games (depending on the age and abilities of the athletes)
Use different swimming devices (depending on each athlete)

Contents	Exercises - organizing tips	Duration
Warm up	• Accommodation with the wet body and face • Use different exercises and games so that the athlete learns the specific breathing and floating	10 ′
Learning the kick on the front	• Kick on front with the hands on the wall – demonstration and practice together • The coach / volunteer assists the athlete and demonstrates whenever necessary • The fins can be used – to learn the correct drill • A floating device or floating devices is / are used depending on the athlete Additional activities: • Kick on front with the hands on the ladder of the pool – the partner supports the athlete (floating devices can be used)	30 ′
Play time	• Doing things alone or with a coach / volunteer(s)	5 ′
Exit the pool	• Exit the water • Shower	5 ′

Discussion points	The athletes' experiences in the water The athletes' favorite exercises and activities
Safety	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers. The coach / volunteer(s) shows / show all the exercises
Key words	Water – kick on front

Lesson 12: Propelling

Goal: Learning the kick on front

Short presentation:

Kick on front. Practical exercises / games in the water

Material:

Kickboard. Floating devices. Fins

Alternative activities:

Use different exercises and games (depending on the age and abilities of the athletes)
Use different swimming devices (depending on each athlete)

Contents	Exercises - organizing tips	Duration
Warm up	• Accommodation with the wet body and face • Different exercises and games so that the athlete consolidates their specific breathing and floating	10'
Learning the kick on front	• Kick on front with the hands on the wall – demonstration and practice together • Kick on front with the hands on a kickboard – demonstration and practice together • Kick on front with the hands on a kickboard from one wall to the opposite wall of the swimming pool • The coach / volunteer assists the athlete and demonstrates whenever necessary	30'

	• The fins can be used – to learn the correct drill • A floating device or floating devices is / are used depending on the athlete Additional activities: • Kick on front with the hands on a partner – the partner pulls the athlete through the water (floating devices can be used) • Kick on front with the hands on a kickboard – a partner pulls the athlete through the water (floating devices can be used)	
 **Play time**	• Doing things alone or with a coach / volunteer(s)	5 ′
Exit the pool	• Exit the water • Shower	5 ′
 **Discussion points**	The athletes' experiences in the water The athletes' favorite exercises and activities	
 **Safety**	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers. The coach / volunteer(s) shows / show all the exercises	
 **Key words**	Water – kick on front	

Lesson 13: Propelling
 **Goal:** Learning the kick on front **Short presentation:**  Kick on front. Practical exercises / games in the water
Material:     Kickboard. Floating devices. Fins

Alternative activities: 

Use different exercises and games (depending on the age and abilities of the athletes).
Use different swimming devices (depending on each athlete)

Contents	Exercises - organizing tips	Duration
Warm up	• Accommodation with the wet body and face • Different exercises and games so that the athlete consolidates their specific breathing and floating	10 ′
Learning the kick on front	• Kick on front with the hands on the wall – demonstration and practice together • Kick on front with the hands on a kickboard – demonstration and practice together • Kick on front with the hands on a kickboard from one wall to the opposite wall of the swimming pool • The coach / volunteer assists the athlete and demonstrates whenever necessary • The fins can be used – to learn the correct drill • A floating device or floating devices is / are used depending on the athlete Additional activities: • Kick on front with the hands on a partner – the partner pulls the athlete through the water (floating devices can be used) • Kick on front with the hands on a kickboard – a partner pulls the athlete through the water (floating devices can be used)	30 ′
 **Play time**	• Doing things alone or with a coach / volunteer(s)	5 ′
Exit the pool	• Exit the water • Shower	5 ′
 **Discussion points**	The athletes' experiences in the water The athletes' favorite exercises and activities	
 **Safety**	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers. The coach / volunteer(s) shows / show all the exercises	
 **Key words**	Water – kick on front	

Lesson 14: Propelling

Goal: Learning the kick on back

Short presentation:

Kick on back. Practical exercises in the water

Material:

Kickboard. Floating devices. Fins

Alternative activities:

Use different exercises and games (depending on the age of the athletes)
Use different swimming devices (depending on each athlete)

Contents	Exercises - organizing tips	Duration
Warm up	• Accommodation with the wet body and face	5 ′
Learning the kick on the back	• Kick on back with the hands on the wall – demonstration and practice together • Kick on back with the hands on a kickboard – demonstration and practice together • The coach / volunteer assists the athlete and demonstrates whenever necessary • The fins can be used – to learn the correct drill • A floating device or floating devices is / are used depending on the athlete • Kick on front with the hands on a kickboard over different distances Additional activities: • Kick on back with the hands on the ladder of the pool – the partner supports the athlete (floating devices can be used)	35 ′
Play time	• Doing things alone or with a coach / volunteer(s)	5 ′
Exit the pool	• Exit the water • Shower	5 ′
Discussion points	The athletes' experiences in the water The athletes' favorite exercises and activities	

Safety	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers The coach / volunteer(s) shows / show all the exercises
Key words	Water – kick on front – kick on back

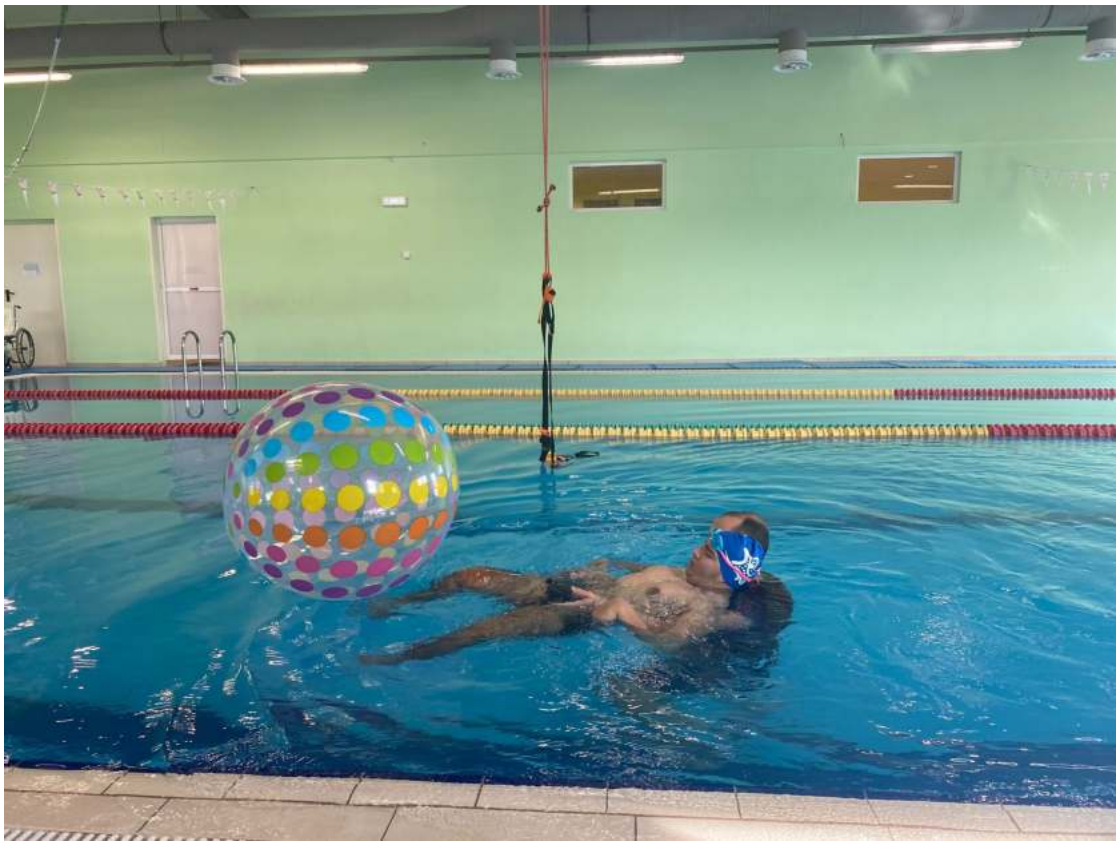
Lesson 15: Propelling		
Goal: Learning the kick on back **Short presentation:** Kick on back. Practical exercises in the water		
Material: Kickboard. Floating devices. Fins		
Alternative activities: Use different exercises and games (depending on the age and abilities of the athletes). Use different swimming devices (depending on each athlete)		
Contents	**Exercises - organizing tips**	**Duration**
Warm up	• Accommodation with the wet body and face	5 ′
Learning the kick on back	• Kick on back with the hands on the wall – demonstration and practice together • Kick on back with the hands on a kickboard – demonstration and practice together • The coach / volunteer assists the athlete and demonstrates whenever necessary • The fins can be used – to learn the correct drill • A floating device or floating devices is / are used depending on the athlete • Kick on back with the hands on a kickboard over different distances	35 ′

	Additional activities: • Kick on back with the hands on a partner – the partner pulls the athlete through the water (floating devices can be used) • Kick on back with the hands on a kickboard – a partner pulls the athlete through the water (floating devices can be used)	
 **Play time**	• Doing things alone or with a coach / volunteer(s)	5 ′
Exit the pool	• Exit the water • Shower	5 ′
 **Discussion points**	The athletes' experiences in the water The athletes' favorite exercises and activities	
 **Safety**	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers. The coach / volunteer(s) shows / show all the exercises	
 **Key words**	Water – kick on front – kick on back	

Lesson 16: Propelling
 **Goal:** Learning the kick on back **Short presentation:**    Kick on back. Practical exercises in the water
Material:       Kickboard. Floating devices. Fins
Alternative activities:    Use different exercises and games (depending on the age and abilities of the athletes) Use different swimming devices (depending on each athlete)

Contents	Exercises - organizing tips	Duration
Warm up	• Accommodation with the wet body and face	5 ′
Learning the kick on back	• Kick on back with the hands on the wall – demonstration and practice together • Kick on back with the hands on a kickboard – demonstration and practice together. • The coach / volunteer assists the athlete and demonstrates whenever necessary. • The fins can be used – to learn the correct drill. • A floating device or floating devices is / are used depending on the athlete • Kick on front with the hands on a kickboard over different distances Additional activities: • Kick on back with the hands on a partner – the partner pulls the athlete through the water (floating devices can be used) • Kick on back with the hands on a kickboard – a partner pulls the athlete through the water (floating devices can be used)	35 ′
 **Play time**	• Doing things alone or with a coach / volunteer(s)	5 ′
Exit the pool	• Exit the water • Shower	5 ′
 **Discussion points**	The athletes' experiences in the water The athletes' favorite exercises and activities	
 **Safety**	The analogy is 1/1 The coach / volunteer(s) is / are always in the water with the swimmers. The coach / volunteer(s) shows / show all the exercises	
 **Key words**	Water – kick on front – kick on back	

Gallery of lessons in practice!



The end

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