12 ASSESSMENT OF PHYSICAL FITNESS OF ADULTS WITH INTELLECTUAL DISABILITIES AND THEIR SUPPORT IN UNDERTAKING PHYSICAL ACTIVITY

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12.1 The concept of intellectual disability

The concept of intellectual disability and its definitions have been functioning in the literature for a relatively short time. It replaced such terms as: "retarded", "special needs", "disease", "handicapped", or "mentally handicapped". The concept of "intellectual disability" is included in both the classification of the American Association on Intellectual and Developmental Disabilities [AAIDD]) and The Diagnostic and Statistical Manual of Mental Disorders [DSM-5]) issued under the aegis of the American Psychiatric Association [APA]) (American Psychiatric Association, 2022; Schalock & wsp., 2010). In the latest edition of the International Classification of Diseases 11th Revision, the concept of mental retardation has been replaced by intellectual development disorders. This classification was approved by the World Health Organisation on January 1, 2022 and is gradually being introduced by more countries (World Health Organisation, 2022).

To diagnose intellectual development disorders, it is necessary to confirm:

1. significant limitations in intellectual functioning in various domains such as perceptual reasoning, working memory, processing speed, and verbal comprehension. If possible, scores should be measured using appropriately standardized, standardized tests of intellectual functioning and concluded that scores are approximately 2 or more standard deviations below the mean (i.e., less than the 2.3th percentile).

2. significant limitations in adaptive behaviours, which refer to a set of conceptual, social, and practical skills that people have learned and use in their daily lives.

3. onset occurs during the developmental period (K. Lee et al., 2024).

12.2 The concept of physical fitness

One of the key elements of planning and implementing activities in the field of sport, physical education and rehabilitation is the assessment of physical fitness. It is particularly important when working with people with various forms of disability. The results obtained during the

procedure allow for safe and effective planning of further actions and correction and modification of rehabilitation procedures.

The concept of physical fitness is understood as "the entirety of human abilities and skills enabling the effective performance of all motor tasks" (Szopa et al., 2000). Such broadly understood fitness of the body consists of, among others, such elements as cardiorespiratory efficiency, muscle strength and endurance, body composition, flexibility, balance, agility, coordination, reaction time and power. Physical fitness is often associated with the ability to achieve high performance in sports and in areas that require motor skills. However, a certain level of physical fitness is primarily one of the factors determining effective performance in the environment, it allows you to perform daily activities effectively, safely and with the least possible effort, and also allows you to stay healthy.

Among the numerous theories concerning physical fitness, the concept of Health-Related Fitness (H-RF) deserves special attention in the context of people with disabilities. According to it, the goal of physical fitness is "positive health that determines a low risk of health problems. Achievements, on the other hand, are aimed at the ability to engage in everyday tasks with adequate energy and satisfying participation in the sports of their choice."(Howley & Franks, 1997). The authors of this concept understand physical fitness in a multidimensional way, taking into account the components whose maintenance at an appropriate level determines good health, good physical condition and well-being. They include five groups:

1. Morphological efficiency

- BMI (Body Mass Index),
- fat distribution,
- bone mineral density.

2. Musculoskeletal fitness

- muscle strength and endurance,
- flexibility.

3. Motor skills

- posture control (balance, coordination, mental control and neuromuscular speed)

4. Cardiorespiratory fitness

- submaximal exercise capacity and endurance,

- oxygen supply system,
- resynteza ATP,
- thermoregulatory processes,
- VO2max (maximum minute oxygen uptake).

5. Metabolic efficiency

- lipid metabolism,
- carbohydrate metabolism,
- the endocrine system (e.g. insulin).

12.3 Assessment of physical fitness of persons with intellectual disabilities

The assessment of individual components of physical fitness is important in each period of ontogeny. The results obtained allow, among other things, the use of appropriate forms of activity and modification of loads. The basis for the assessment of physical fitness are functional sphere tests. Their correct selection and execution are of key importance.

The assessment of physical fitness of people with disabilities, including intellectual disabilities, is a complex process and requires special attention and an individual approach. The choice of test, its difficulty, as well as the instruction must be adapted to the physical and cognitive abilities of a person with intellectual disabilities. Incorrect test selection may result in drop-out or incorrect results. The maximum commitment and motivation of the examined person is also important. It is worth focusing on the assessment of those parameters that are important in the daily functioning of a person with intellectual disabilities. The tests should be preceded by basic anthropometric measurements; measurement of height, body weight and calculation of the BMI index. Its value is obtained by converting the quotient of body weight to the square of the body height expressed in meters (kg/m2).

$$BMI = \frac{body\ weight\ [kg]}{body\ height\ [m]^2}$$

Next, the following should be assessed: coordination, balance, muscle strength and endurance, flexibility and cardiorespiratory capacity.

Due to the large diversity of the group of people with intellectual disabilities, there is no homogeneous, generally accepted procedure. Each person should be treated individually, with respect for their emotional state, cognitive abilities, temperament and personality. Ensuring maximum comfort and safety will allow the tested people to present their maximum capabilities. For this purpose, the subjects should be dressed in comfortable sports clothes, and the trials should be preceded by a short warm-up. Particular attention should be paid to safe, sports footwear, although it is not required in all trials. It is worth remembering that people with a more severe degree of disability are often emotionally very close to the caregiver and explaining important issues to them is also very important. Sometimes the involvement of the caregiver and their help in conducting the examination is very helpful. Among the recommended tests, you can choose:

1. The Eurofit Special test battery,

consisting of six attempts: explosive leg strength (standing broad jump test), arm strength (pushing a 2 kg ball test), abdominal muscle endurance (sit-up test), speed (25 meter run test), flexibility (sit and reach test), and balance (walk on a bench test) (Skowronski et al., 2009).

4. **The standing broad jump test**

This test assesses the explosive power of the lower limbs. The subject, standing with both legs in front of the line of rebound, performs a squat with a swing of the arms backwards and jumps as far as possible with a swing of the arms forward. The practitioner's feet are bare. Landing occurs with both legs without losing balance. Two trial jumps and two evaluated jumps are performed. The distance from the starting line to the point of contact of the posterior edge of the heel with the ground was measured. If the heels of the feet were not at the same level – the distance was measured from the point closer to the starting line. The measurement is made with an accuracy of cm.

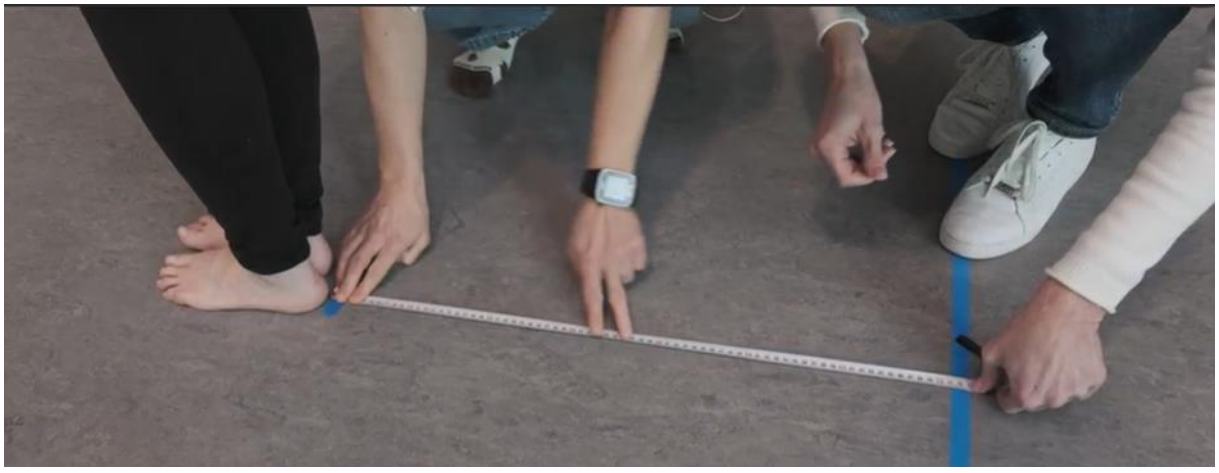

Figure 1 Measuring the result of the standing long jump test

2. **The sit-up test**

The test measures the endurance of the abdominal muscles and hip flexors. The patient lies with his back to his back, his lower limbs bent at the knee joints at an angle of about 90^0, his shoulders on the back of his neck. Then the patient bends the torso forward, touching the knees with the elbows and straightening the torso to the position of lying backwards. The exercise time is 30 seconds, only bends made according to the instructions are counted, the measurement is performed only once.

Figure 2 Performing a forward bend of the torso from lying backwards with the lower limbs bent

3. **The sit and reach test**

Flexibility measurement is carried out using a measuring table with a scaled top. The table top protrudes beyond the zero point – foot touches – 30 cm. The result is read with an accuracy of 1 cm. The test consists in leaning the torso from a straight position and slowly moving the fingers as far as possible along the bench, while keeping the lower limbs straight. The result is recorded at the moment of taking the stationary farthest position. The test is performed barefoot. The first bend is a trial, the second, performed after a short break, is evaluated. The result is the length of the bend measured in cm.

Figure 3 Flexibility measurement

5. **25 meter run test**

The test evaluates speed. The test is performed on a sports field or hall. The start and finish places should be clearly marked. The loud command "READY" is in force and then the starting signal is followed by a whistle. The run is performed from a high start, in sports shoes. Time measured with an accuracy of 0.01 s.

3. **Pushing a 2 kg ball test**

The test assesses upper limb strength and coordination. The thrust is performed with the stronger upper limb. The subject stands in a lunge with the lower limb opposite to the upper limb performing the thrust. The ball is rested on the palm of the hand, supported by the other hand. The subject dynamically straightens the upper limb with simultaneous forward movement of the torso so as to push the ball as far as possible. The ball is to be pushed, not thrown, the feet should be in constant contact with the ground, the line of throw must not be crossed. The distance is measured with an accuracy of 1 cm, from the place where the ball falls to the line of the designated throw. We make the attempt twice, we take into account the better result.

5. **Walk on a bench test**

The test assesses dynamic balance and is carried out on a gymnastic bench /test A/ and, if possible, the exerciser on an inverted bench /test B/.

Trial A – The subject stands without sports shoes in front of a line 2 m away from the edge of the bench, approaches the bench on his/her own, climbs on it and moves around it (without supporting himself or putting his feet on the floor).

Trial B – Is carried out when test A has been successful, according to the same rules, with the bench turned upside down; The transition is made on the narrow side of the skirting board.

The duration of the trial should not be longer than 30s.

The evaluation consists in awarding contractual points:

1 point – failure to perform the test attempt

2 points – approach to the bench

3 points – walking a 2 m section on the bench or with support along the entire bench

4 points – passage without support along the entire bench (attempt A)

5 points – walking a 2 m section on an inverted bench or with support along the entire bench

6 points – passage without support to the end of the inverted bench (attempt B)

Figure 4 Walking on a gymnastic bench in a high position (A trial, B trial)

2. Functional Reach Test

This test is used to assess dynamic equilibrium and the risk of falls. The subject stands sideways to the wall, the pelvis touches the wall, and the upper limb proximal to the wall is bent at the glenohumeral joint to 90^0. On the wall, the point where the selected finger is located is marked. We measure the distance at which the patient will lean forward, with the pelvis stabilized and the feet remaining stationary in contact with the ground. The test is performed twice, we record the better result, with an accuracy of 1 cm (Duncan et al., 1990).

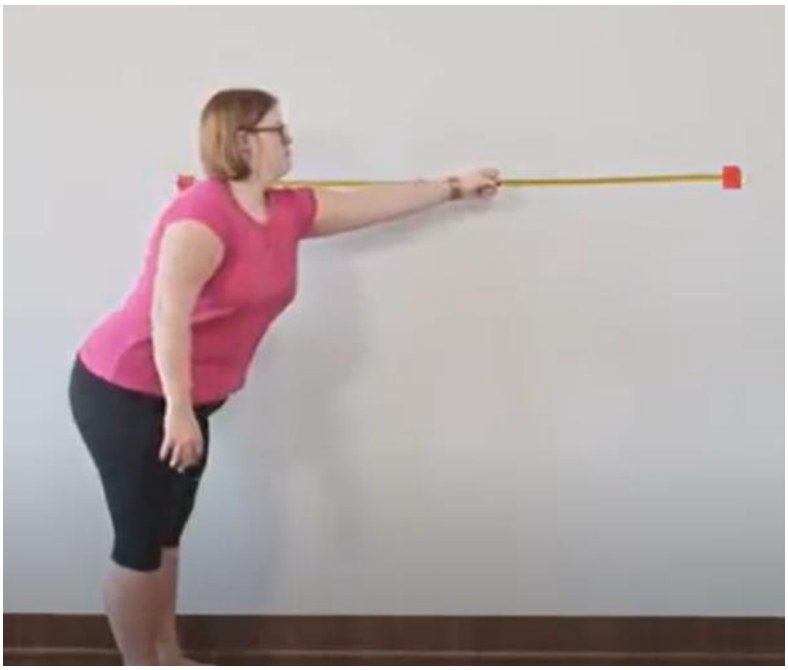

Figure 5 Performing the reach test

Interpretation of results:

Hand extension ≥ 25 cm – low risk of falls

Extending the arm from 15 to 25 cm – the risk of falls is doubled

Arm extension < 15cm – risk of falls increased fourfold

Inability to complete a task or reluctance to perform a task - the risk of falls increased eightfold (Bac et al., 2022)

3. Single Leg Stance test (SLS)

The test is used to assess static equilibrium. The test is performed on any limb chosen by the subject. The patient stands barefoot, one lower limb bent, raised (not supported by the other limb), upper limbs crossed on the chest. The test is performed with the eyes open, then with the eyes closed. In the open-eye test, the subject is asked to concentrate on one point on the wall at eye level. With the help of a stopwatch, we measure the time from the moment of lifting

the lower limb to the moment of: re-contact of the foot with the ground or support against the other limb, use of the upper limbs to maintain balance or open the eyes when trying with eyes closed. The attempt is also completed when the time of 45 seconds is exceeded. Each attempt is made twice, we record a better result (Oppewal & Hilgenkamp, 2020; Springer et al., 2007)

Table 1 Interpreting the Single-Leg Test (Bac et al., 2022):

AGE	ONE-KNIFE STANDING EYES OPEN [s]	STANDING ONE-KNIFE EYES CLOSED [s]
18 – 39	43,3	9,4
40 – 49	40,3	7,3
50 – 59	37,0	4,8
60 – 69	26,9	2,8
70 – 79	15,0	2,0
80 - 89	6,2	1,3

4. Hand Grip Strength Test (VIDEO 8)

The measurement is performed by squeezing a hand dynamometer. The test is performed in a standing position, the upper limb along the torso so that the arm and hand do not touch the body during the test, the other limb is lowered freely. The second attempt is performed after a short break, the better result is recorded, Measurements are made for both limbs. To see if the participant is squeezing with maximum effort, the test instructor must look at the contracting muscles of the arm and hand, phalanges, and facial expressions. To understand the task well, the participant can first squeeze a rubber ball (Oppewal & Hilgenkamp, 2020).

5. 30 Second Chair Stand Test (30CST, the 30 Second Sit to Stand Test).

It assesses the strength and endurance of the lower limbs. It is part of the Fullerton functional performance test battery and was originally intended to evaluate the elderly. However, it is also used by adults of all ages, including those with intellectual disabilities (Oppewal & Hilgenkamp, 2020).

The test is carried out on a chair of standard height, without armrests. The chair should be placed against the wall to avoid moving the chair. The subject sits in the middle of the chair, with their back straight and their feet shoulder-width apart. One foot can be extended in front of the other for better balance. The arms are crossed at the chest. Before starting the actual trial, you should demonstrate the performance of the test; Slowly at first, then quickly. Then the test subject should perform several trial repetitions.

Figure 6 Performing the 30-second Chair Stand Test

The task of the examined person is to get up from the chair as many times as possible within 30 seconds. Between each repetition, you should be fully seated in a chair. If the test subject has to use their hands to perform the test, they receive 0 points. Incorrectly performed reps are not counted. Standing up more than half the height at the end of 30 seconds counts as full performance. The number of repetitions below the average predicted for a given age group indicates a high risk of falling.

Table 2 Norms of the average number of repetitions for given age groups (https://www.physio-pedia.com)

age	Men	Women
60-64	14-19	12-17
60-64	12-18	11-16
70-74	12-17	10-15
75-79	11-17	10-15
80-84	10-15	9-14
85-89	8-14	8-13
90-94	7-12	4-11

6. **Five Times Sit to Stand Test**

The Five Times Sit to Stand Test (5x Sit-To-Stand Test) is commonly abbreviated as 5XSST. is used to assess the functional strength of the lower limbs, transitional movements, balance and risk of falling in the elderly.

During the trial, the time (accurate to the decimal part in seconds) is measured for which the subject is able to move from sitting to standing and back to sitting five times.

The test is carried out on a chair of standard height, for safety the chair should be placed with its back to the wall. The subject sits in the middle of the chair, with their back straight and their arms crossed over their chest. The task is to sit down and get up 5 times as quickly as possible. The timing begins when the "start" command is uttered and ends when the subject's buttocks touch the seat of the chair after the last repetition. If you are unable to complete five repetitions without assistance (e.g. upper limbs), you will fail the test, and the test will also end after 2 minutes (Whitney et al., 2005).

The shorter the time to perform the test, the better the test result. In addition, the results of age-matched norms are:

11.4 seconds for 60-69 age groups

12.6 seconds for 70-79 age groups

14.8 seconds for 80-89 age groups (Bohannon, 2006)

7. **6-minute walk test**

The 6-minute walk test is used to determine exercise tolerance.

The test is performed in a corridor of at least 30 meters. The corridor should be little frequented, straight, with a hard, flat surface, equipped with two posts at the beginning and at the end. Prepare a place for possible rest during the test, e.g. a chair. Along the route of the march there should be distance markers placed every 1 meter. Before taking the test, the patient should be rested. The test consists of walking the longest distance possible in 6 minutes. The subject may change pace depending on their abilities, and may also stop if they feel tired or shortness of breath. The subject must not run during the test. It is advisable to motivate the examined person. When interpreting the test result, we take into account the distance covered, arterial oxygen saturation, heart rate, blood pressure, shortness of breath and fatigue on a 10-point modified Borg scale (Nasuti et al., 2013).

In assessing physical fitness, it is important to systematically assess progress. Control tests should always be performed under the same conditions and in the same order.

When performing your tasks and conducting subsequent physical fitness tests, you should always remember about the basic principles of work ergonomics; about taking the correct positions, not unnecessarily burdening the skeletal and muscular system. You should also avoid helping and replacing a person with intellectual disabilities if it is not necessary – such action will allow them to show the maximum of their abilities and minimize the risk of excessive burdens for the person conducting the research.

People with intellectual disabilities generally have a lower level of physical fitness compared to their peers in the intellectual norm (Bossink et al., 2017; Hsieh et al., 2017a).

Delayed development of individual components of physical fitness may be directly related to factors causing disability, as well as to additional health problems more often co-occurring in this group.

12.4 Health status of people with intellectual disabilities and physical activity

People with intellectual disabilities are a very heterogeneous group of disorders with different etiology, clinical picture and course. There is no single, typical set of physical and mental characteristics for all people with intellectual disabilities, although there may be common features in certain groups. Intellectual development disorders are associated with a high

percentage of co-occurring mental, behavioural or neurodevelopmental disorders, with a higher incidence of certain conditions such as epilepsy, congenital defects and disorders of the gastrointestinal tract (duodenal stenosis, celiac disease), obesity, visual and hearing dysfunctions, thyroid disorders and sensory disturbances. Adults with intellectual disabilities are more likely than the general population to have mobility problems and take medications that can adversely affect health through side effects. In adults with intellectual disabilities, early mortality and multimorbidity are characterized by higher mortality compared to the general population. The onset of diseases in this group is much earlier, and the incidence of comorbidities at the age of 20–25 years is similar to that in the general population at the age of 50–54 years. Moreover, when faced with health problems, they have much more difficulty accessing the necessary support and appropriate healthcare (Cooper et al., 2015; de Winter et al., 2016; Hermans & Evenhuis, 2014).

Concomitant diseases may be a contraindication to certain physical activities, and this should be taken into account at the planning stage. Modification of the exercise plan should be especially considered when:

6. **Heart defects**

They are particularly common in the group of people with Down syndrome (found in almost half of children). The most common are the common atrioventricular canal and the opening in the interventricular and/or interatrial septum. Currently, in most cases, they can be effectively treated and do not significantly reduce physical activity in the later period. In case of doubt, it is worth consulting a cardiologist about the rehabilitation plan.

7. **Skeletal disorders**

In the context of planning physical activity, the occurrence of axial instability (AAI – atlanto – axial instability) is particularly important, which is found in 13% of children with Down syndrome. The diagnosis of AAI is mainly based on X-ray examination. With high instability, peripheral symptoms appear, most often of a neurological nature. The diagnosis of this abnormality is a contraindication to undertaking certain forms of movement, such as jumping, flipping or strength exercises in pairs. Activities associated with an uncontrolled risk of falling, such as skiing or horse riding, are dangerous. It is also worth being particularly careful when planning hippotherapy.

8. **Endocrine disorders**

Thyroid diseases (hypothyroidism, less often hyperthyroidism) and diabetes are more common than in the general population

9. **Immune disorders**

They cause greater susceptibility to infections, more frequent infections, as well as cancer and autoimmune diseases. It is worth remembering that proper physical activity affects the proper functioning of the immune system and reduces the risk of both viral and bacterial infections.

Moderate intensity efforts, preferably outdoors, are particularly recommended. Excessive fatigue should be avoided, as well as sudden changes in temperature.

10. **Ophthalmic disorders**

Hyperopia, myopia, astigmatism, strabismus and cataracts are more common. In some cases, ophthalmological diseases may be a contraindication to certain exercises. In the case of some eye defects and diseases, exercises causing sudden changes in pressure, i.e. jumps, strength exercises and exercises in which the head is low (bends, rolls), will be contraindicated. It is worth considering consulting an exercise program with an ophthalmologist. Some defects require proper supply of glasses. In people with intellectual disabilities, glasses may be damaged during everyday activities, especially during sports. For this reason, as well as for safety reasons, it is worth opting for sports goggles such as goggles.

11. **Hearing disorders**

In the group of people with intellectual disabilities, hearing disorders are more common. Several dozen percent of people with Down syndrome experience recurrent otitis, which results in hearing loss. Hearing disorders do not affect the selection of exercises, but contribute to delayed speech development and deterioration of language skills. When implementing training programs, you must remember that people with hearing loss require alternative forms of communication and an individual approach.

12. **Growth disorders and abnormal body weight**

Some children with intellectual disabilities grow more slowly and reach a shorter height than their healthy peers. Abnormal body weight is also more often observed. A slower metabolism and problems in determining your nutritional needs can result in overweight or obesity. Among people with intellectual disabilities, you can also find people who are underweight or even extremely malnourished, which can be caused by disorders in swallowing and eating food, inability to take care of their needs and lack of proper care. In many situations, a dietary consultation may be useful. In the case of excessive body weight, aerobic efforts are important. You can offer walking, Nordic walking, swimming and exercises in the water, cycling (also on a tandem bike).

13. **Muscle tone disorders**

Muscle tone disorders are often observed in people with intellectual disabilities. People with Down syndrome are characterized by reduced muscle tone, hypermobility and increased joint laxity. In people with cerebral palsy, increased muscle tone predominates, which can cause limited locomotion and manipulation capabilities.

The overall prevalence of intellectual development disorders is slightly higher in men. In some societies, reduced social values and expectations towards women compared to men can negatively affect the accurate diagnosis and provision of appropriate support to women with intellectual disabilities. This makes it more difficult for them to achieve and show their range of

capabilities. Men and women also differ in the prevalence of certain behaviors and mental, behavioral, or neurodevelopmental disorders. Men are more likely to show hyperactivity and behavioural disorders, while women are more likely to show mood disorders and increased anxiety (also before new situations, challenges, physical activity) and it is worth taking this into account when planning physical activity (Cooper et al., 2015; Kosmol et al., 2021; van Timmeren et al., 2017; World Health Organization, 2022).

A decrease in intellectual potential and additional dysfunctions and problems affect the approach and the ability to undertake various activities. The results of the study clearly indicate that as a result of physiological and psychological factors, people with intellectual disabilities are characterized by a more passive lifestyle and less motivation to undertake regular physical activity. This is another factor that has a strong impact on physical fitness (Bossink et al., 2017; Hsieh et al., 2017b; Martin Ginis et al., 2021).

12.5 Determinants of physical activity

Currently, there are no global analyses of physical activity of people with disabilities, but the available data show that among people with intellectual disabilities as many as 58-89% do not meet the recommendations for physical activity (Hsieh et al., 2017b). Thus, they are more likely to suffer from serious health problems related to inactivity than the general population (Martin Ginis et al., 2021). Low levels of physical activity have long been recognised as a major risk factor for the development of major non-communicable diseases, including type 2 diabetes, coronary heart disease, stroke and some cancers, and are recognised as the fourth leading risk factor for mortality, with an estimated three million deaths per year worldwide (I. M. Lee et al., 2012). When engaging a person with an intellectual disability in physical activity, it may be useful to identify the factors that make it difficult or easier for them to participate.

Personal, social, financial, environmental, and family factors include low self-efficacy, lack of parental support, inadequate or unavailable accommodations, and lack of appropriate programs. The most commonly reported facilitators included high self-efficacy, enjoyment of PA, sufficient support from loved ones, social interaction with peers, attendance at school physical education classes, and tailored PA programs. Identifying the factors influencing physical activity are often crucial for engaging people with intellectual disabilities to change and maintain positive behaviors. The lack of information in this area hinders effective and long-term actions. In order to achieve optimal results, it is also necessary to cooperate in an interdisciplinary team including a physiotherapist, occupational therapist and often a cardiologist, neurologist, dietician and others. Understanding and support from loved ones: family, friends and caregivers is also important (Bossink et al., 2017, 2020; Jacinto et al., 2021).

12.6 The role of communication

In order to effectively include people with intellectual disabilities in physical activity programs, communication tailored to the individual needs of the recipient is necessary. When talking

about people with intellectual disabilities and addressing a person with intellectual disabilities, you should show great sensitivity and use language that emphasizes the value of all people as full members of our common society. If we are dealing with an adult and we are not in a close relationship, we should use the polite form "Ma'am, sir", even if this person addresses us by our first name. If the relationship is closer, of course, you can use a name or warmer forms, provided that it is comfortable for each person. In the first place, we always address the person with intellectual disability directly, respecting their autonomy, and not their caregiver.

In contact with a person with intellectual disabilities, special empathy is necessary. In this group, in addition to limitations in intellectual functioning, there are also limitations in adaptive behaviors in terms of conceptual, social and practical skills used in everyday life. People with intellectual disabilities may have problems with communication, interpersonal relationships, compliance with rules and the law, and responsibility for their behavior. Problems in understanding or producing speech and language or in using language for communication purposes are more common. Older adults with intellectual development disorders may experience a faster onset of dementia or a decline in skills compared to the general population. It is important to remember that if a person with an intellectual disability does not make eye contact or does not respond to words, it does not mean that they do not listen to us or ignore us. Often, people with intellectual disabilities need more time to understand what is expected of them and make certain decisions, but this does not mean that they cannot do it.

Communication difficulties will depend largely on the degree of intellectual disability. In general, people with mild disabilities can communicate fluently, including about past, present and future events. Most are able to communicate their decisions about future goals, health care, and relationships (e.g., who they prefer to spend time with and how they prefer to spend time with). Most can also follow and follow instructions of up to 3 steps.

People with moderate intellectual disabilities are mostly able to communicate in short sentences and communicate their preferences for future goals, health care and relationships, but they will not always follow through on their statements. Most can follow instructions of up to two steps, so you need to use short and simple instructions when describing individual fitness tests.

Most people with severe intellectual disabilities are able to use communication strategies to indicate their preferences, including those regarding future goals, health care, and relationships in specific choices. Visual aids can be useful in communication. Most people in this group can follow the one-step instructions and stop the activity when requested.

People with profound intellectual disability are mostly able to convey information about their basic needs and preferences using non-verbal strategies, various forms of expression, gestures, smiles. Verbal communication using single words is rare. Most of them can perform very simple tasks, using hints and help (García et al., 2020; Smith et al., 2020; World Health Organization, 2022).

In communication with people with intellectual disabilities, it is worth thinking about the use of tools, techniques and strategies in the field of Augmentative and Alternative Communication (AAC)

This includes a variety of methods used to support communication among people with verbal communication difficulties. These methods can be used by all people who, due to congenital or acquired causes, temporarily or permanently, have problems with communication through speech. AAC works well in both adults and children.

In the acronym AAC, the first "A" *Augmentative* directly stands for enlargement, amplification. In this context, it is supporting communication: improving, adding, supplementing speech through sign language, images, boards, communicators containing signs. This makes the message more understandable to the listener.

The second "A" *Alternative* in AAC stands for Alternative Communication. It applies when a person cannot speak or when others do not understand their speech. In such situations, other ways of communication are needed.

Letter “C” means *Communication* (Crowe et al., 2022; Przybysz-Zaremba, 2020).

Speech disorders are more common in the group of people with intellectual disabilities compared to the general population. Unable to express their thoughts and needs, they are in a disadvantageous situation and their competences, potential and capabilities also in the field of physical activity may be misjudged by the environment. In addition, the inability to communicate can cause frustration and be a source of additional suffering.

Supportive and alternative communication can make it easier for people with intellectual disabilities to express their needs, preferences and opinions, also in terms of physical activity. Finding an effective way of communication also helps in establishing relationships with other people and increases the independence and independence of the person. It may also turn out that a given person has a much greater intellectual potential than initially estimated.

In your work, you can use, among other things:

25. Graphic information carriers – pictograms.

A pictogram can graphically represent a person, object or activity, or entire statements can be created from them. They can be used as communication signs, to create a daily schedule, an active board or an educational booklet. The most popular are:

6. PCS, Picture Communication Symbols

The PCS set includes around 5000 basic symbols, supplemented by additional symbols and country-specific symbols. For example, in the Polish version, these are images of Polish dishes, money, famous people. It is one of the most widely used symbol systems in the world, at the moment PCS symbols have been translated into 40 different languages. In PCS, each

symbol graphically represents a word or sentence organized in categories such as People, Food, Leisure....

Some symbols come in two versions adapted to the needs of people with different levels of understanding, which may be particularly important in communication with people with intellectual disabilities. The system can be available in the form of booklets, colourful stickers and computer programs such as Boardmaker™ or Speaking Dynamically™ Pro. These programs allow you to create educational materials that can be used directly or using a computer.

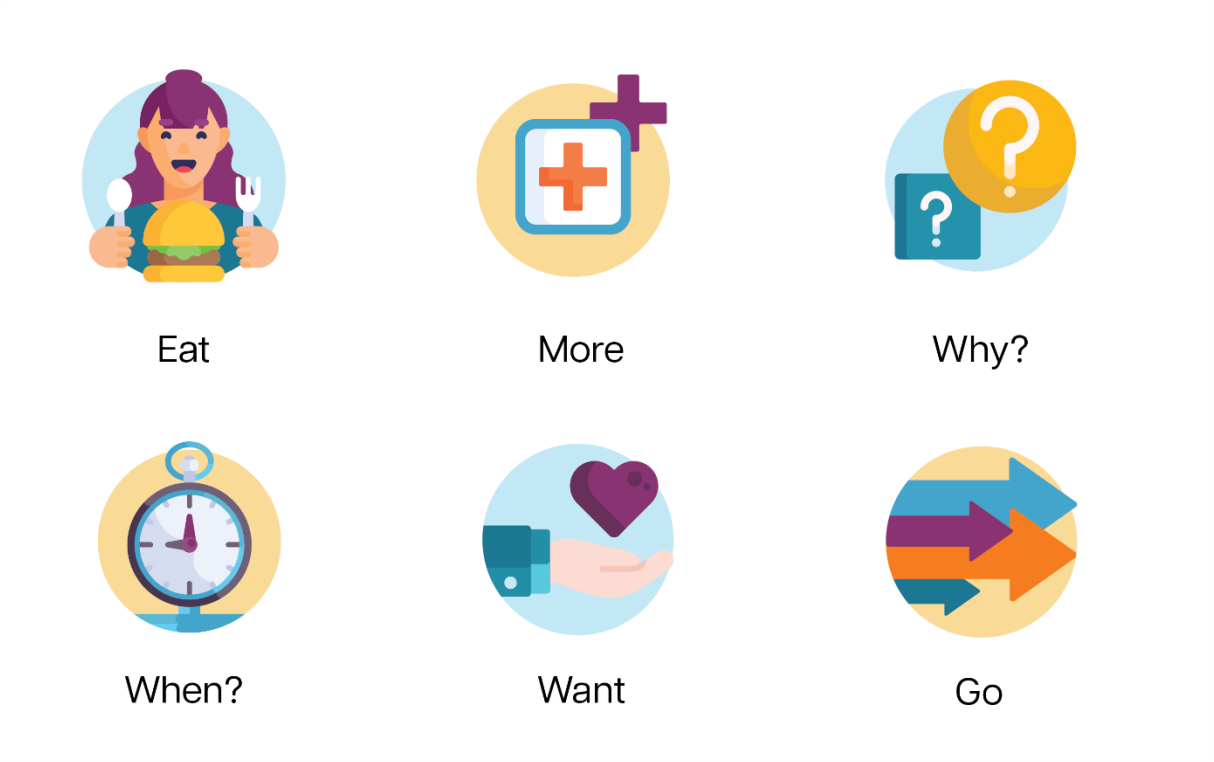

Figure 7 Example symbols (https://goboardmaker.com/)

14. PIC, Pictogram Ideogram Communication

These are white characters, made on a black background, often with a signature. The contrasting combination of two colours is to make it easier to understand the signs. This system allows people with verbal speech disorders to communicate, as well as people who communicate in completely different languages and cultures

15. Picturegrams – Picturegraphs, both black and white and colour.

16. Makaton® Language Program - a system of gestures and graphic symbols

The Makaton system combines graphic and manual signs. It was originally developed for adults with deaf and intellectual disabilities and was based on gestures. Currently, the system

is used by children and adults with the so-called "complex communication needs", including intellectual disability, Down syndrome, cerebral palsy, autism, after craniocerebral injury, stroke, as well as by caregivers, families and friends of these people. Each country that uses Makaton has its own completely different set of gestures, except for English-speaking countries that use the British version. For example, the Polish gestures of Makaton® differ significantly from the British version, they refer to Polish culture: language, religion, behaviour and customs. They also have an additional name KONi® - Communication of the Disabled.

Makaton®'s gestures are simple to perform, legible (you can guess the meaning of a given gesture) and iconic (easy to remember and reproduce).

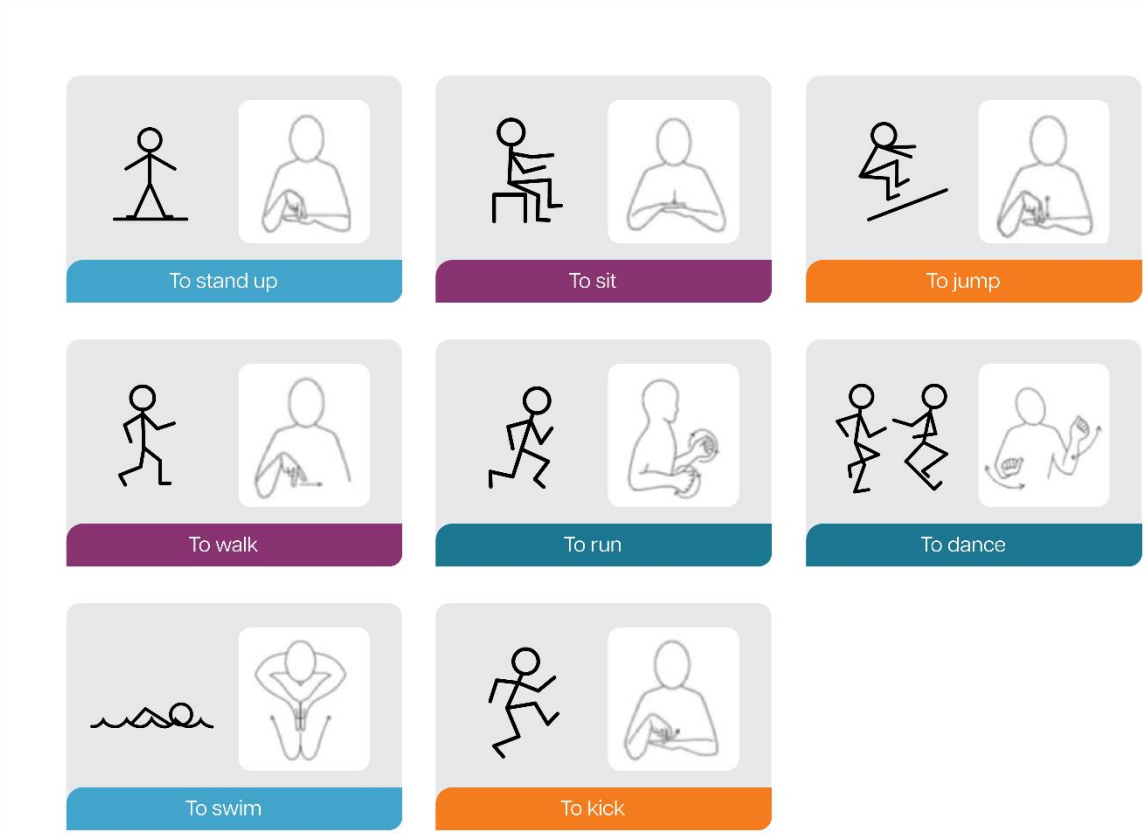

Figure 8 Example graphic and manual signs (https://www.keenoxford.org/the-keen-blog/all-about-makaton)

Makaton®'s graphic signs are black and white line drawings, simple enough to be drawn by hand. They are especially useful for people who, due to certain motor dysfunctions, are unable to make the right gestures.

17.Bliss Communication System

It is a method of communication in which words are presented in the form of drawings. Symbols are in the form of simple geometric shapes, such as circles, lines, squares, arrows, etc. When another graphic element is added to a simple symbol, a new image is created that logically changes the meaning of the symbol. The advantage of the system is the fact that it allows you

to build longer statements and describe events and emotions. However, this method can be difficult to master for people with a lower level of intellectual development.

Figure 9 Bliss symbol examples (https://www.omniglot.com/writing/blissymbolics.htm)

Picture 18. Modern technologies in AAC

In recent years, there has been a sharp increase in the use of technology in education and support for people with intellectual and developmental disabilities. To support the communication process, specially prepared computer software and speech-assisted communication systems are used (e.g. applications on Apple™ devices, GoTalk9+, AMDi Tech/Plus 32, ablenet® BIGmack; Logan, Iacono and Trembath, most often behind a touch screen. The functionality of these technologies is increasing year by year, its availability is also increasing, while costs are decreasing. However, it should be remembered that people with disabilities are often in a disadvantaged financial situation and their access to modern technologies may be limited (Allen et al., 2017; Kaczmarek, 2021; Lang & McLay, 2023; Syriopoulou-Delli & Eleni, 2022).

Recommendations for intercultural communication:

- Adapt your communication style to the needs and preferences of the customer. Use simple language, visual aids, and specific examples for easy understanding.
- Take the time to build trust and customer relationships. Create a supportive and non-judgmental environment where they feel comfortable expressing themselves and discussing their goals.
- Practice active listening to understand the interests, motivations and concerns of the client and their loved ones related to undertaking a specific physical activity. Appreciate their enthusiasm and willingness to participate.
- Conduct a thorough assessment of the client's physical ability to undertake a specific sporting activity. If necessary, consider consulting with other health professionals, such as occupational therapists, special educators, cardiologists, or dietitians.
- Provide clear and simple instructions on safety measures and techniques for each activity. Emphasize the importance of following safety tips to prevent injuries and injuries.
- Develop a structured and gradual training program that enables the client to gradually build skills and confidence in their chosen discipline. Break down tasks into easy-to-follow steps and appreciate even small achievements. Appreciate effort, perseverance, and determination in pursuing your goals.
- Create an inclusive and supportive environment in the sports center. Encourage staff and other athletes to be patient, understanding, and respectful of people with disabilities.
- Involve family members or account managers in the planning and support process. Provide guidance and resources to help them understand the benefits and challenges of physical activity for people with intellectual disabilities.

12.7 Opportunities for physical activity

There is no evidence that physical activity is inadvisable in the group of people with disabilities. On the other hand, a positive effect of physical activity on cardiorespiratory fitness, muscle strength, functional skills and psychosocial well-being has been demonstrated in people with both physical and cognitive disabilities. Thanks to the growing awareness and openness of societies to the needs of people with intellectual disabilities, they have a chance to derive joy and satisfaction from participating in various sports disciplines. The rules and regulations of these disciplines are modeled on disciplines practiced by non-disabled people or modified to meet the needs of people with disabilities. In some cases, additional support in the form of appropriately modified and adapted equipment is also necessary.

People with intellectual disabilities can pursue their passions in disciplines such as:

16. Team games
17. Swimming
18. Dance
19. Judo
20. Golf
21. Tennis
22. Powerlifting
23. Horsemanship
24. Athletics
25. Cross-country skiing
26. Alpine
27. Sailing
28. Sport and rock climbing
29. Frisbee game

and many more.

An example of a sports discipline that seemingly seems to be intended for people with special physical and mental predispositions is sport climbing. It turns out that it can be successfully practiced by people with various forms of disability, including intellectual disabilities, bringing them a number of benefits in the area of physical fitness and mental health. This form of activity is used, among others, in the therapy of people with Down syndrome, autism spectrum, Asperger's syndrome, cerebral palsy, neurological diseases of various origins. For people with intellectual disabilities in many countries, various elements of climbing have been used for years as part of sports activities and rehabilitation camps. Sports competitions are also organized, as well as climbing events integrating various sports communities. Participation in such events not only improves overall physical fitness, but also increases self-esteem and self-confidence (Bibro & Żarów, 2021; Liu et al., 2022).

Figure 10 Participants of climbing classes, Tarnów Academy, Poland

Special Olympics Mission

The largest sports and social organization in the world, associating people with intellectual disabilities, is the Special Olympics. The beginnings of the movement date back to the 60s of the twentieth century, when Eunice Kennedy Shriver, sister of President John Kennedy, was the initiator of the creation of an international sports organization for people with intellectual disabilities. The first day camps organized for young people showed how important physical activity and various forms of sports competition are for the development of people with intellectual disabilities. The 1st Special Olympics International Summer Games were held in 1968 in Chicago, and in 1977 in Colorado, athletes competed in winter sports for the first time during the Special Olympics World Winter Games. Initially, the movement developed in the United States and Canada, now it has its branches and representatives all over the world. From the very beginning, the Games were very popular, already in the first event 1000 athletes with intellectual disabilities took part. The last Special Olympics 2023 World Games, held in Berlin, Germany, saw 6,500 athletes compete, supported by 3,000 coaches, support staff and 9,000 volunteers. The organizer estimates that the individual events attracted a total of 330,000 spectators. Since then, more and more world-class events have been systematically held. Eunice Kennedy Shriver is a person who has undeniably contributed to the development of sport for people with intellectual disabilities, as well as to increasing public awareness of

intellectual disability, increasing knowledge in this area and increasing the rights of people with disabilities. Her huge contribution in this area has been appreciated and every year on September 22, EKS Day is celebrated in her honour.

Currently, the Special Olympics movement is:

- 227 National Programs in 177 countries
- 3.9 million players
- 7 Continental Offices, Washington, D.C. Headquarters
- Over 1 million family members
- over 500 thousand volunteers
- over 300 thousand trainers
- over 20 thousand sports competitions and events per year
- 32 winter and summer sports.

The mission of Special Olympics is to provide people with intellectual disabilities aged at least eight with a year-round series of training and sports competitions in a wide range of Olympic disciplines. The activities of Special Olympics focus on organizing training and sports competitions for people with intellectual disabilities. Through sport, players develop both physically and socially. They learn new skills, break their own barriers, become more courageous, open-minded and confident. In addition to sport, initiatives are also created to change public awareness of the potential, skills and needs of people with intellectual disabilities. The "Young Athletes" program is dedicated to younger people. It is a program supporting the physical and social development of children with intellectual disabilities aged 2-12. It includes sports games and activities, as well as preparation for disciplines such as basketball, football, cycling and swimming. Another program of the Special Olympics is the "Unified Sports" program. "This program connects approximately equal numbers of Special Olympics athletes with athletes with intellectually normal athletes (called partners) in sports teams during training and competitions. The age and fitness level of the athletes and partners are specified in detail depending on the discipline." The disciplines practised under the programme include, among others: basketball, badminton, indoor hockey, football, softball, table tennis, handball, tennis, volleyball. Joint training and participation in competitions support the development of physical fitness, allow you to gain new experiences and make new acquaintances and friendships.

A unique rehabilitation and training program of the Special Olympics is the Motor Activity Training Program (MATP). It is dedicated to people who cannot participate in official Special Olympics training and sports competitions due to physical disabilities coexisting with

intellectual disability, preventing them from participating in the sports offered as part of the Special Olympics, or inability to understand and comply with the rules of competition and sports regulations of the Special Olympics, e.g. due to a severe intellectual disability.

MATP refers to the sports disciplines practiced in the Special Olympics. Examples of competitions in official Special Olympics competitions for people with the lowest fitness are: in athletics – e.g. throwing a ball, long jump from a standstill, walking with an assist of 25 m; in swimming – 10 m with an assist.

The MATP program primarily emphasizes the benefits of systematic and consistent work between the therapist and the athlete. Unlike sports disciplines, there is no element of competition between participants and strict adherence to rules and regulations.

Special Olympics is not only about sporting activities, but also about building social environments that are welcoming to everyone, regardless of their level of ability. They provide support to teachers, trainers, volunteers, students, administrative staff, so that it is possible to create spaces where everyone feels valued and welcomed. Special Olympics financially supports initiatives around the world to implement projects that create an inclusive environment. They also support scientific research in this area.

On the website of the Special Olympics in your country, you can easily find addresses and contact details of regional offices. You can also get information about programs and projects implemented in your area and dedicated to people with intellectual disabilities (Special Olympics; Special Olympics).

12.8 Legal situation of persons with intellectual disabilities

In the case of people with intellectual disabilities, their legal situation may have an additional role in making decisions, including those concerning health and physical activity. The legal situation of adults with intellectual disabilities is often complicated. According to the provisions of Polish civil law, every person after reaching the age of 18 gains the ability to independently manage their own fate. Therefore, all decisions regarding the tests, research and activities to be carried out should be directly agreed with the client. Nevertheless, some adults with intellectual disabilities have difficulties in fully understanding the situation, and may also have problems with unambiguous communication of their will. Therefore, it is worth taking into account the opinions of the guardian/parent in your actions. Most often, it is the caregivers/parents who know the person best, communicate with them most easily and know their needs and preferences best. Their help can be crucial both during the examination and in planning the improvement process.

In our practice, we can also deal with a completely incapacitated person. Such a decision can be made by the court in the case of a person with an intellectual disability who is unable to manage his or her own proceedings. The basis for incapacitation can always be only the good of the person who is to be incapacitated, and the reason for its ruling cannot be the need of

officials, family, economic situation or inability to communicate with a given person. The main effect of a ruling on total incapacitation is the loss of legal capacity. The competences of the guardian as the statutory representative of the ward are similar to the rights of the parents exercising parental authority, and it is they who must consent to all activities in the field of diagnostics and therapy. However, even in such a situation, you should always communicate with a person with an intellectual disability in the first place.

According to Polish law, an adult disabled person has full capacity to make decisions about himself. However, in reality, these individuals rarely live, most often relying on their parents and other family members to organize their daily activities. This means that they need parental consent to engage in m.in sporting activity. Parents and caregivers can adopt different attitudes. Through their overprotection and excessive care, as well as lack of faith in the abilities of the ward, they can limit their development. Supportive parents who are actively involved in the activities they undertake will be an encouragement and companionship, increasing the child's chances for development. Undoubtedly, effective communication and cooperation with people from your client's immediate environment will facilitate the planning and implementation of any sports or therapeutic program.

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