

PHYSICAL AND SPORT ACTIVITIES OF INTELLECTUALLY DISABLED INDIVIDUALS

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The low level of physical fitness of intellectually disabled individuals is most often the result of a sedentary lifestyle and the lack of the possibility for these individuals to take part in various forms of physical activity, and as a consequence these individuals are often unable to take part in any form of planned physical activities, are unable to adequately perform everyday activities and have limited abilities for performing work-related duties. Regular physical activity can have a preventive effect, can reduce health risks and prevent the onset of various illnesses, as well as to promote an active lifestyle and increase physical and work capacities among the members of this particular population. Sport can play an important role in the life of individuals with intellectual disability as it represents a good basis for the development of physical and cognitive abilities. Team sports, which include interaction among a large number of people, a decision-making processes in a variety of situations and the understanding of the game itself in its constituent parts can be used as an effective and practical treatment of individuals with intellectual disability. *Acta Medica Medianae 2012;51(2):45-49.*

Key words: *physical activity, intellectual disability, sport*

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Introduction

Physical exercise and the appropriate level of physical fitness are both considered relevant for the health of individuals who are intellectually disabled, while regular physical activity during one's lifetime is recommended for the purpose of prevention of illness and the increase of emotional stability (1). Physical activity among individuals suffering from intellectual disability contributes to their psychophysical progress, facilitates their performance of basic daily activities and increases their motivation to live (2). Taking part in sport can help individuals with intellectual disability increase their self-respect and realize their social skills, as well as collaborate with other individuals suffering from the same disability (3).

Physical activity among individuals with intellectual disability

Regular physical activity can be used as a preventive measure, can reduce the risk to one's health and prevent the occurrence of certain illnesses, as well as promote an active lifestyle and increase the physical and work capacities among members of this specific population (4). The determinants which define physical fitness and which are

directly related to the general state of health include: body composition, cardio-respiratory endurance, flexibility, coordination, muscle strength and muscle endurance (5,6). Nevertheless, many focused studies have indicated that individuals with intellectual disability score lower results on standardized tests of physical fitness during all the phases of their life than the members of the population of normal individuals (5-8). Because of this, individuals who are intellectually disabled are often unable to adequately perform everyday activities and have limited abilities for performing their work-related duties.

One of the latest studies in this area has determined a direct connection between the levels of physical fitness and the time needed to perform daily tasks in the case of adults with intellectual disability (9). These findings indicate that physical activity can improve the quality of life of individuals with intellectual disability. Nevertheless, some studies have shown that physical inactivity and obesity among individuals with intellectual disability cause great problems for their general health. For this reason, it is recommended that the experts begin to include this population into various programs and initiatives for the promotion of health, including greater participation in physical activities (7). Muscle endurance and aerobic capacity can be reduced to such a great extent among individuals who are intellectually disabled that they impede the daily functioning of the members of this population (4,10). It is well-known that muscle strength and balance among individuals with intellectual disability decrease with adulthood, which is a period when other health

risks also occur, such as an increase in weight and obesity (11). These factors additionally have a negative effect on the level of physical fitness, and also increase the risk of a fall in various situations in which the stability of the surface the intellectually disabled individuals find themselves on is disturbed (12). Even though certain studies have shown that differences in the level of intellectual disability can influence the level of physical abilities, and that individuals with a higher IQ show greater progress in terms of motor skills over a longer period of time (13), today, it is considered that a lower level of physical fitness among individuals with intellectual disability is the consequence of a sedentary lifestyle and the lack of possibility for these individuals to participate in any form of planned physical activity.

Regular physical activity can contribute not only to an improvement in muscle strength and aerobic endurance, but can also improve balance and self-perception among individuals with intellectual disability (14). The participation of children and adults with intellectual disability in recreational and sports activities often improves the overall quality of their lives and improves their social inclusion (15). Nevertheless, there are obstacles which often hinder or reduce the possibility of regular participation in physical activities among individuals with intellectual disability. These include certain functional limitations of certain individuals, the lack of suitable objects, terrains or specialized programs, as well as the high cost of the organization of such forms of physical activity (16).

During adolescence, daily physical activity is of essential importance for the improvement of health, proper growth and development, as well as the decrease in the risk factors for the onset of cardio-vascular and metabolic disorders later on in adulthood. The existing guidelines recommend at least 60 minutes of moderate to intense physical activity for adolescents several days a week (17). For that reason, it is necessary to enable the necessary preconditions for the physical activity of adolescents with intellectual disability, so that they could have equal opportunities as their peers. The aforementioned can be achieved through a variety of physical activities (physical education classes, inclusive activities, class activities and so on), under the guidance of a dedicated and qualified physical education professor (18).

Sports activities of individuals with intellectual disability

Sport can play an important role in the lives of individuals with intellectual disability since it represents a good foundation for the development of physical and cognitive abilities. The effective inclusion of individuals with intellectual disability in sports competitions requires not only a thorough knowledge of the various forms of development of motor and functional skills, but also the understanding of their inter-relations and the interaction of the cognitive abilities and psychological potential of these athletes. All of the aforementioned

components can be represented in the "physical potential – cognitive potential – sports performance" triangle. Sports performance can further be analyzed as a product of physical and cognitive potential. In case of individuals with intellectual disability, cognitive potential includes "intelligence" as a multidimensional group of reasoning, planning and decision-making and learning from experience (8). The causal relationships between these components should be studied in order for the sports potential of individuals with intellectual disability to be studied in greater detail.

Young individuals with intellectual disability (aged 20-30) usually have cardio-respiratory endurance which is by 8-12% lower than the expected values for the normal population of the same gender and age (19), while the values of maximal heart rate frequency were lower by approximately 15 beats/min in comparison to the values of the normal population of the same gender and age (10). Approximately, 20% of adults with intellectual disability were classified as obese with a high inversely proportional relation between intelligence and the percentage of body fat (20). A comparison of muscle strength in the elbow joint and the knee joint of young individuals with intellectual disability with the values obtained from a normal population of the same age and gender has indicated that their values were lower by 35-40% (21), which indicates a predominantly sedentary lifestyle of individuals with intellectual disability. One of the rare studies which dealt with flexibility has indicated that there are no significant differences between individuals with intellectual disabilities and a normal population of the same gender and age (22). As a consequence of the aforementioned results, it is often considered that a lower level of physical preparation among individuals with intellectual disability "is related to the type of disability" even though a sedentary lifestyle without sufficient physical activity is the main cause of such a state (23). For this reason, it is oftentimes unclear to which extent the level of physical fitness among individuals suffering from intellectual disability reflects their full potential.

Team sports are a popular way for individuals with intellectual disability to take part in physical activities. Basketball is often used as a part of programmed physical activities for individuals with intellectual disability, but also as an individual sports activity of these individuals, since it includes the development of motor skills (running, jumping, kicking, and so on) through joint work and cooperation among individuals with the same extent of the disability (24). Even though in this day and age there is a relatively well-developed system of sport activities for individuals suffering from intellectual disability, few scientific publications exist on the topic of sports activities available for this specific population.

Various hypotheses can be found in the literature regarding the fact that psychological factors, through various types of imaginary exercise or practice, as well as their combination with real-physical exercise, contribute to an improvement in

the performance of motor tasks among mentally healthy individuals. Research has shown that psychological fitness has a positive effect on the learning of motor tasks in case of normal individuals, since it leads to the formation of movements and the preparation for their performance in the sensory-motor parts of the cortex (25,26). Similar studies carried out on intellectually disabled individuals (27,28) have shown that psychological preparation significantly improves the performance of motor tasks and reduces variability during their performance. That is why it is recommended for physical education teachers who work with intellectually disabled individuals to use psychological preparations which are related to the selected physical and/or sports activity, with the aim of the better acquisition of certain motor skills. Oftentimes, without any actual basis, it is considered that a certain level of intellectual disability prevents certain individuals from taking part in the training system necessary for the preparation of individuals suffering from intellectual disability, and the reason that is cited is the inability for the preparation of a suitable – higher level of competitiveness which is required in the sports competitions for this population (8).

Effects of a specially adapted basketball training program on individuals with intellectual disability

The problems of interaction among individuals with intellectual disability are frequent, and so specially adapted basketball training is used as a means for improving relations among the members of this specific population. The very nature of the basketball environment, which includes interaction among a greater number of people, the decision-making process in a series of various situations and the understanding of the game in its constituent parts, is the reason why this type of activity is often used as an effective and practical treatment for individuals with intellectual disability (13). Basketball can lead to a significant increase in the effectiveness of the muscle system of individuals with intellectual disability and has a positive effect on their socialization through joint game playing (29). Different factors can explain the mechanism of the influence of basketball training on the motor skills of individuals with intellectual disability. Exposure to complex factors during the specific planning and programming of basketball training can influence neurological plasticity through an increase in cell proliferation and the creation of a neural network in certain parts of the brain such as the cortex in the parietal lobe of the brain, as well as the cerebellum. In addition to the fact that

motor learning can lead to an increase in the number of synapses, only physical activity during training can lead to an increase in the capillary network due to an increase in oxygen uptake (29-31). Nevertheless, there is still a lot to learn about molecular mechanisms and intercellular signalization during the acquisition of motor skills among individuals with intellectual disability. We can only speculate that the positive effects which occur in the normal brain as a consequence of training also occur among individuals with intellectual disability, and that they contribute in the same way to motor learning. In a study of the effects of four years of basketball training of younger individuals with intellectual disability (average age 25) a significant increase in muscle strength was determined, even though the training program did not include the load exercises (32). Even though the study was carried out on a small number of participants, it clearly showed that systematically planned physical activity through adapted basketball training has multiple positive effects on the level of physical fitness of individuals with intellectual disability.

Conclusion

The low level of physical fitness of individuals with intellectual disability is most often a consequence of a sedentary lifestyle and a lack of the opportunities of these individuals to be involved in any sort of planned physical activity. That is why it is necessary for qualified experts to include this population in various programs and initiatives for the promotion of health, in addition to their increased participation in various physical activities. Objective problems such as a lack of suitable objects, fields, or specialized programs, as well as the high cost of the organization of such forms of physical activity, can in the beginning be overcome through a variety of different forms (physical education classes, inclusive activities, activities in the classroom etc.), under the guidance of a dedicated and qualified physical education professor and regular medical control.

Specially adapted basketball education and the very nature of the basketball environment, which includes the interaction of various individuals, a decision-making processes over a variety of different situations and the understanding of the game in all its constituent parts, can be a means of improving the interaction and promotion of connections between members of this specific population. These improvements can offer a significant contribution to the overall social and professional development of an individual with intellectual disability.

References

1. Fernhall B. Physical fitness and exercise training of individuals with mental retardation. *Med Sci Sports Exerc* 1993; 25: 442–50. [[PubMed](#)]
2. Podgorski CA, Kessler K, Cacia B. Physical activity intervention for older adults with intellectual disability: report on a pilot project. *Ment Retard* 2004; 42: 272–83. [[CrossRef](#)] [[PubMed](#)]
3. Dykens EM, Rosner BA, Butterbaugh G. Exercise and sports in children and adolescents with developmental disabilities. Positive physical and psychosocial effects. *Child Adolesc Psychiatr Clin N Am* 1998; 7: 757–71. [[PubMed](#)]
4. Carmeli E, Barchad S, Lenger R, Coleman R. Muscle power, locomotor performance and flexibility in aging mentally-retarded adults with and without Down's syndrome. *J Musculoskelet Neuronal Interact* 2002; 2(5): 457–62. [[PubMed](#)]
5. Chanias AK, Reid G, Hoover ML. Exercise effects on health related physical fitness of individuals with an intellectual disability: A meta-analysis. *Adapt Phys Activ Q* 1998; 15: 119–40.
6. Graham A, Reid G. Physical Fitness of adults with an intellectual disability: A 13-year follow-up study. *Res Q Exerc Sport* 2000; 71: 152–61. [[PubMed](#)]
7. Rimmer JH, Heller T, Wang E, Valerio I. Improvements in physical fitness in adults with Down syndrome. *Am J Mental Retard* 2004; 109: 165–74. [[CrossRef](#)] [[PubMed](#)]
8. Van de Vliet P, Rintala P, Fröjd K, Verellen J, Van Houtte S, Daly DJ, et al. Physical fitness profile of elite athletes with intellectual disability. *Scand J Med Sci Sport* 2006; 16(6): 417–25. [[CrossRef](#)] [[PubMed](#)]
9. Cowley PM, Ploutz-Snyder LL, Baynard T, Heffernan K, Jae SY, Hsu S, et al. Physical fitness predicts functional tasks in individuals with Down syndrome. *Med Sci Sport Exerc* 2010; 42(2): 388–93. [[CrossRef](#)] [[PubMed](#)]
10. Fernhall B, Pitetti KH. Limitations to work capacity in individuals with intellectual disabilities. *Clin Exerc Physiol* 2001; 3: 176–85.
11. Lahtiner U, Rintala P, Malin A. Physical performance of individuals with intellectual disability: A 30 year follow up. *Adapt Phys Activ Q* 2007; 24(2): 125–43. [[PubMed](#)]
12. Hale L, Bray A, Littmann A. Assessing the balance capabilities of people with profound intellectual disabilities who have experienced a fall. *J Intell Disab Res* 2007; 51(4): 260–8. [[CrossRef](#)] [[PubMed](#)]
13. Beadle-Brown J, Murphy G, Wing L, Gould J, Shah A, Holmes N. Changes in skills for people with intellectual disability: a follow-up of the Camberwell Cohort. *J Intell Disabil Res* 2000; 44: 12–24. [[CrossRef](#)] [[PubMed](#)]
14. Carmeli E, Zinger-Vaknin T, Morad M, Merrick J. Can physical training have an effect on well-being in adults with mild intellectual disability? *Mech Ageing Dev* 2005; 126(2): 299–304. [[CrossRef](#)] [[PubMed](#)]
15. Wilson PE. Exercise and sports for children who have disabilities. *Phys Med Rehabil Clin N Am* 2002; 13(4): 907–23. [[CrossRef](#)]
16. King G, Law M, King S, Rosenbaum P, Kertoy MK, Young NL. A conceptual model of the factors affecting the recreation and leisure participation of children with disabilities. *Phys Occup Ther Pediatr* 2003; 23(1): 63–90. [[CrossRef](#)] [[PubMed](#)]
17. Strong W, Malina RM, Blimkie CJR. Evidence based physical activity for school-age youth. *J Pediatr* 2005; 146: 732–7. [[CrossRef](#)] [[PubMed](#)]
18. Pitetti KH, Beets MW, Combs C. Activity levels of children with intellectual disabilities during school. *Med Sci Sport Exerc* 2009; 41(8): 1580–6. [[CrossRef](#)] [[PubMed](#)]
19. Fernhall B, Pitetti KH, Rimmer JH, McCubbin JA, Rintala P, Millar AL, Kittredge J, Burkett LN. Cardio respiratory capacity of individuals with mental retardation including Down syndrome. *Med Sci Sports Exerc* 1996; 28: 366–71. [[CrossRef](#)] [[PubMed](#)]
20. Hove O. Weight survey on adult persons with mental retardation living in the community. *Res Dev Dis* 2004; 25: 9–17. [[CrossRef](#)] [[PubMed](#)]
21. Horvat M, Pitetti KH, Croce R. Isokinetic torque, average power, and flexion/extension ratios in nondisabled adults and adults with mental retardation. *J Orthop Sports Phys Ther* 1997; 25: 395–9. [[PubMed](#)]
22. Frey GC, McCubbin JA, Hannigan-Downs S, Kasser SL, Skaggs SO. Physical fitness of trained runners with and without mild mental retardation. *Adapt Phys Activ Q* 1999; 16: 126–37.
23. Draheim CC, Williams DP, McCubbin JA. Physical activity, dietary intake, and the insulin resistance syndrome in nondiabetic adults with mental retardation. *Am J Ment Ret* 2002; 107: 361–75. [[CrossRef](#)] [[PubMed](#)]
24. Gencoz F. The effects of basketball training on the maladaptive behaviors of trainable mentally retarded children. *Res Dev Disabil* 1997; 18: 1–10. [[CrossRef](#)]
25. Feltz DL, Landers DM. The effects of mental practice on motor skill learning and performance: A meta-analysis. *J Sport Psychol* 1983; 5: 25–57.
26. Jeannerod M. The representing brain: Neural correlates of motor intention and imagery. *Behav Brain Sci* 1994; 17: 187–245. [[CrossRef](#)]
27. Porretta DL, Surburg PR. Imagery and physical practice in the acquisition of gross motor timing of coincidence by adolescents with mild mental retardation. *Percept Motor Skill* 1995; 80: 1171–83. [[CrossRef](#)] [[PubMed](#)]
28. Hemayattalab R, Movahedi A. Effects of different variations of mental and physical practice on sport skill learning in adolescents with mental retardation. *Res Dev Disabil* 2010; 31: 81–6. [[CrossRef](#)] [[PubMed](#)]
29. Guidetti L, Franciosi E, Emerenziani GP, Gallotta MC, Baldari C. Assessing basketball ability in players with mental retardation. *Br J Sport Med* 2009; 43: 208–12. [[CrossRef](#)] [[PubMed](#)]
30. Tomic K, Mihajlovic G, Jovanovic Mihajlovic N, Djukic Dejanovic S, Mihajlovic K, et al. Diagnosis and treatment of depression in persons with intellectual disability. *Acta Medica Medianae* 2011; 50(3): 81–9. [[CrossRef](#)]
31. Dong WK, Greenough WT. Plasticity of nonneuronal brain tissue: roles in developmental disorders. *Ment Retard Dev Disabil Res* 2004; 10: 85–90. [[CrossRef](#)] [[PubMed](#)]
32. Tsimaras VK, Samara CA, Kotzamanidou MC, Bassa EI, Fotiadou EG, Kotzamanidis CM. (2009). The effect of basketball training on the muscle strength of adults with mental retardation. *J Strength Cond Res* 2009; 23(9): 2638–44. [[CrossRef](#)] [[PubMed](#)]

FIZIČKE I SPORTSKE AKTIVNOSTI KOD OSOBA SA MENTALNOM RETARDACIJOM

Zoran Stanišić

Nizak nivo fizičke pripremljenosti osoba sa mentalnom retardacijom najčešće je rezultat sedatarnog načina života i nedostatka mogućnosti da se ove osobe uključe u bilo koje oblike planirane fizičke aktivnosti, zbog čega često nisu u stanju da adekvatno obavljaju aktivnosti svakodnevnog života i imaju ograničene mogućnosti za obavljanje radnih obaveza i zaposlenje. Redovna fizička aktivnost može da deluje preventivno, smanji rizike po zdravlje i spreči nastanak određenih bolesti, kao i da promovira aktivni način života i poveća fizičke i radne kapacitete kod ove specifične populacije. Sport može imati važnu ulogu u životu osoba sa mentalnom retardacijom jer predstavlja dobru osnovu za razvoj fizičkih i kognitivnih sposobnosti. Timski sportovi, koji uključuju interakciju više osoba, procese donošenja odluka kroz niz različitih situacija i razumevanje same igre u njenim sastavnim delovima, mogu se koristiti kao efikasan i praktičan tretman za osobe sa mentalnom retardacijom. *Acta Medica Medianae 2012; 51(2):45-49.*

Ključne reči: fizička aktivnost, mentalna retardacija, sport