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Aspects Related to the Training of Athletes with Disabilities for Participation in Sports Competitions

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Abstract: Sports competitions for athletes in general and athletes with disabilities in particular can contribute to gaining social values on a personal level. However, participation in sports competitions requires the initial training of athletes, which will also condition their play throughout these competitions. A distinct feature of sports competitions for people with intellectual disabilities is the existence of the divisioning test, which allows the distribution of athletes into value groups according to their abilities. For bocce, the divisioning test includes a modified game during which athletes throw the 8 balls three times to the pallina placed at three different distances (9.15 m, 12.20 m and 15.25 m) on the playing area. Research participants are 20 people (9 female and 11 male) with intellectual disabilities. In the current research, three tests were applied: an initial test, an intermediate test and a final test. The research methods used, namely the documentation method, the experiment method, the mathematical and statistical method and the graphical method, highlight the values achieved by athletes for the three aforementioned distances. The scores obtained in the three tests indicate a two-way oscillation of players' results from one test to another, which is normal for this category of athletes. But the three tests of the game are extremely useful and must be practised during training lessons. The results obtained in these tests are indicative for their subsequent play during the competition and allow to compare an athlete with other people having the same disability and almost similar motor levels.

Keywords: *bocce, divisioning, pallina, balls, test, modified game.*

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Introduction

People with intellectual disabilities display developmental delays that affect the integrity of their bodies but differently for each person. These delays also occur in their motor development and are conditioned by several aspects, including the Intelligence Quotient (IQ) (Gilderthorp et al., 2017). If the IQ is 60-70, people can learn the motor skills specific to various sports but if the IQ value is below 60, the learning of these motor skills is difficult.

In recent decades, important steps have been taken to facilitate the learning process for people with intellectual disabilities. This process has acquired a number of specific features that are also related to motor learning. Moreover, international sports bodies and organisations have changed and adapted their sports regulations (simplified rules, modified sports equipment, etc.) to allow people with disabilities to play those sports, or have designed new sports programmes such as Unified Sports, created by Special Olympics International for people with and without disabilities who are invited to learn together sports-specific skills (Bota et al., 2013; Pan & Davis, 2018) and use them within the same team while participating in different competitions. Definitely, the learning of motor skills occurs in a different way for both people with intellectual disabilities and non-disabled people. Depending on the level of technical skills, those involved can participate in international sports competitions (high motor level for all participants), national and regional competitions (where non-disabled athletes are mentors for athletes with disabilities) or recreational competitions (where the technical level does not matter, the emphasis being on relaxation, fun, social integration, etc.).

External stimulation helps people with intellectual disabilities to communicate and integrate into the activity along with non-disabled people, which influences and promotes learning. It is obvious that people with intellectual disabilities integrated into an entity where they have the opportunity to move still need support, but the favourable context enables them to make steady progress, even if they learn with small steps (Malak et al., 2015). At the same time, Sacks and Buckley (2003) believe that the motor development of children with intellectual disabilities is similar to that of children without disabilities when comparing their mental age instead of chronological age. It is important to exploit the motor skills of people with intellectual disabilities, given that they are able to express themselves through movement according to individual capabilities.

Over time, the number of sports played by people with intellectual disabilities has increased. Thus, they practise sports that require a high level of consolidation and improvement of motor skills, as well as sports that include simple motor skills but also require a good level of motor skill development. Moreover, an increasing number of sports games can be played in the form of Unified Sports. The bocce game belongs to this last category.

Bocce is also played in individual competitions by people with intellectual disabilities, having the third most active population of athletes, behind football and golf (Pan & Davis, 2015). The technique of the game is simple (Pagnoni, 2010) and involves throwing or rolling the pallina and bocce balls as close to the target as possible (Mujea et al., 2019).

However, not only the simple technique encourages the practice of this game, but also the way of organising sports competitions for this category of people with disabilities. Special Olympics International offers all athletes the opportunity to participate in competitions, compete against other athletes with the same disabilities and win. There are a number of criteria based on which athletes are assigned to competitions. One of these criteria is the level of acquisition of specific motor skills. Based on this criterion, the competition can be attended by people who are in different stages of motor learning because the distribution of participants is based on equal ability. This is one of the most important criteria underlying the organisation of competitions by Special Olympics International (2018), each sport having its own particular way of assessing the level of acquisition of the technique.

The technical elements used to handle the balls, which have different sizes and weights, are as follows: ball pick-up, basic stance, grip and release. They must be performed with precision, which has a decisive role in achieving good motor performance (Neagu & Papp, 2012). But for bocce-specific skills to be performed with a high level of precision, they must be practised for a long time (Pagnoni, 2010). This period is even longer for people with intellectual disabilities because, in their case, motor acquisitions occur with more difficulty and at a slower pace (Malak et al., 2013).

In parallel with learning specific motor skills, athletes with intellectual disabilities must work for the development of general motor skills, which will later allow the education of specific motor skills. In this case, too, the time required is longer (Sacks & Buckley, 2003) because the initial level of motor ability in this category of people is very low (Teodorescu et al., 2007).

Although simple, the motor skills specific to the game of bocce require both conditional and coordination motor abilities. The latter are very important because this game is based on eye-hand coordination, which has a decisive role in motor tasks that have to be performed correctly, easily and accurately (Bompa, 2002). Malak et al. (2013) note that the low level of coordination is responsible for the difficulties that arise in the execution of motor skills. At the same time, coordination requires attention and concentration (Malak et al., 2013), which is why people with mild mental retardation can better perform coordination tasks compared to people with moderate or severe mental retardation.

Of great importance during the throw is the force imparted to the pallina or balls (Mujea et al., 2019). If the pallina must be thrown into an area strictly specified by the regulation, the balls must be thrown with some force to reach the target (as close as possible to the pallina), displace the opponent's balls as far away from the pallina as possible, or any other option depending on the tactics learned by the athlete.

At the same time, attention should be paid to the speed with which the throwing movement is performed because precision also depends on this conditional ability (Sacks & Buckley, 2003). Pagnoni (2010) recommends not to forget that precision is much more important than the force or speed imparted to the ball because it brings the player the desired points.

What is certain is that both the specific motor skills and the education of the motor abilities involved require appropriate preparation based on regular training lessons. These do not take place at random but rely on the athlete's motor potential assessment, which is performed in the first training lessons with the help of tests specific to the sports branch concerned.

Before starting the training lessons, the objectives pursued and the level of competition in which athletes with intellectual disabilities want to participate must be established. But those involved in the training of these athletes should always keep in mind that performance itself is not a goal. It is important to maximise their potential and minimise their diseases (Teodorescu et al., 2007).

The training must last at least 60 minutes, and the exercise intensity must be moderate (Matute-Llorente et al., 2013) or high (Fragala-Pinkham et al., 2010), depending on the development of motor skills in athletes with intellectual disabilities and their associated medical problems.

For people with intellectual disabilities, too, the content of the training must combine all its components so that athletes can benefit from multi-purpose preparation for participation in competition.

Physical training is present from the first lesson. One should always take into account that physical training underlies the other training components, especially the technical and tactical ones. The emphasis is on basic motor skills, knowing that their level of education is low (Matute-Llorente et al., 2013; Asonitou et al., 2018; Paul et al., 2019). Educating the fitness components is important (Braneț, 2016b, p. 181) because they also reflect on the work skills used in everyday life.

Particular attention should be paid to technical training. From the beginning of the learning, emphasis should be placed on the correct movement because a proper technique enables throwing the pallina and/or balls on the playing area as close as possible to the desired target.

Tactical training is also found in the preparation of athletes with intellectual disabilities. Although it does not seem like it, the game of bocce has several tactical actions. They must be learned by athletes with disabilities during training and applied in competitions regardless of the opponents' tactical actions or the playing surface. In our opinion, the tactical actions most often used by athletes with intellectual disabilities consist in sending the balls as close to the pallina as possible or displacing the pallina from where it is at that moment.

Theoretical training is also very important because knowing the regulation is essential for participating in competitions. From the first lessons, the coach must teach athletes the main rules, using a language adapted to their level of understanding. Regarding the game of bocce, players must learn the rules about: the field lines and their role, throwing the pallina and balls, as well as the point awarding methods.

Purpose

The purpose of this paper is to highlight some particular aspects of bocce training in order to ensure the participation of athletes with intellectual disabilities in sports competitions. In this context, the paper captures specific features of the bocce training components and the familiarisation of these athletes with the divisioning tests existing in their sports competitions.

Thus, the study presents the results achieved by athletes with intellectual disabilities in the divisioning test used by Special Olympics International in bocce competitions. The events of this test must be practised during training lessons not necessarily for the athlete to obtain the lowest possible score and thus rank in a higher value group, but to feel safe, in a state of mental comfort induced by the fact that they know what to do.

All of this is needed because the tests involve a modified game of bocce (Special Olympics International, 2018) that differs from the game itself. This preliminary training will also condition athletic performance during bocce competitions.

Research question

Will the identification of features specific to the training of athletes with intellectual disabilities and the systematic practice of the bocce tests included in the divisioning process during training lessons result in the learning and consolidation of required skills and thus in getting them used to the specifics of bocce sports competitions?

Methodology

Participants

The study was conducted on 20 athletes with intellectual disabilities (9 female and 11 male aged 18-35 years) who participated in bocce training sessions distributed over 17 months. Throughout the intervention, we complied with the provisions of the World Medical Association Declaration of Helsinki (2013) and obtained parental consent to measure, process, interpret and publish the data obtained from the tests applied. We did not have the prior approval of the ethics committee to develop this study.

Training lessons were focused on the education and learning of motor skills (Teodorescu et al., 2007) specific to the game of bocce so that it can be played for a long time as a means of maintaining health and preventing disease, reducing sedentary lifestyle and facilitating social inclusion.

Research methods

a) documentation method – was achieved by studying the literature or consulting online scientific articles on the topic of people with intellectual disabilities and how they improve their motor potential. We also reviewed the bocce books and articles, as well as the materials provided to us by Special Olympics International on this topic;

b) experiment method – the study was a quasi-experiment based on the tests proposed and used by Special Olympics International for the divisioning process within the sports competition.

The participation in competition of athletes with intellectual disabilities has two phases. The first involves the divisioning, where athletes are assessed for their level of acquisition of the specific technique. For this

step, the test consists of a modified game of bocce during which athletes throw the 8 balls three times towards the pallina placed at three different distances on the playing area. According to the regulations (Special Olympics International, 2018), the distances at which the pallina is placed are:

• the first distance is 9.15 m away from the back board of the playing field;

• the second distance is 12.20 m away from the back board of the playing field;

• the third distance is 15.24 m away from the back board of the playing field.

After the athlete has thrown all the balls to the first spot (9.15 m), the referees measure the distance between the pallina and the nearest 3 balls. The second series of throws to the pallina placed at the second distance (12.20 m) is then performed, and the best placed 3 balls are measured. The same is done for the third distance (15.24 m). To throw all the balls to the three distances, the athlete is always behind the shooting line.

When the test is over, the scores achieved by the athlete are summed up. A lower score indicates a better technique, therefore a higher level of acquisition of the specific technique. Based on the final result, the athlete is assigned to a value group.

The second phase involves participation in the game of bocce played in compliance with the official Special Olympics regulations (Special Olympics International, 2018) and within the value group where the athlete has been assigned following the divisioning test.

In this paper, we address the divisioning test because it puts athletes in different situations, forces them to focus and highlight all the skills they have acquired during training lessons (precision, speed, strength, balance, etc.), which are harmoniously combined with specific throwing skills.

The testing was applied three times as follows: the initial test (IT), at the beginning of the training lessons; the intermediate test (InT), 9 months after the beginning of the training; the final test (FT), after another 8 months of participation in the training. The training period was not continuous. It was interrupted by school holidays or vacation periods, public holidays and other activities in which athletes were involved.

c) mathematical and statistical method – was used to interpret the results obtained. We used the arithmetic mean and standard deviation to identify the motor potential of each tested athlete in order to prepare them for participation in sports competitions at any level.

d) graphical method – was used to present the results and better highlight the differences, facilitating the understanding of the need for this research topic.

Results

Following the application of the test described above, the following results were obtained:

• first distance – the pallina was placed at 9.15 m (Table 1):

Table 1. *Results obtained by athletes for the pallina placed at 9.15 m*

Athlete	IT	InT	FT
1	1600	480	723
2	745	740	338
3	2108	608	875
4	2324	795	627
5	347	339	534
6	2332	1384	852
7	834	568	470
8	199	328	575
9	1892	1348	820
10	1675	728	827
11	1389	1602	888
12	1428	233	765
13	379	790	805
14	1389	1602	888
15	244	191	276
16	2634	214	852
17	1018	878	608
18	1378	578	277
19	957	704	1317
20	2208	1088	867

Source: Authors' own conception

Regarding the results for the 9.15-m test, the arithmetic mean obtained by athletes in the initial test is equal to 1354 cm. In the intermediate test, they obtained an arithmetic mean of 759.9 cm, while in the

final test, their arithmetic mean was 709.2 cm. A difference of 594.1 cm is found between the initial test and the intermediate test. Between the initial test and the final test, the difference is 644.8 cm, which demonstrates an improvement in the performance of athletes with intellectual disabilities.

- the arithmetic mean obtained by athletes in the IT = 1354 cm
- the arithmetic mean obtained by athletes in the InT = 759.9 cm
- the arithmetic mean obtained by athletes in the FT = 709.2 cm
- standard deviation for the results obtained in the IT = 732.72
- standard deviation for the results obtained in the InT = 431.06
- standard deviation for the results obtained in the FT = 244.98

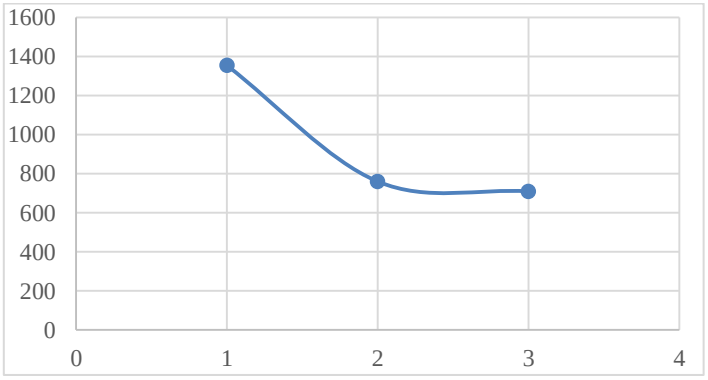


Figure 1. Evolution of the results expressed by the arithmetic mean for the pallina placed at the distance of 9.15 m
Source: Authors' own conception

For the distance of 9.15 m, athletes improved their results from one test to another (Figure 1), which indicates that they have consolidated the technique and developed the motor skills required for releasing the bocce ball. The results obtained showed that the balls were placed at a great distance from the pallina. This was normal because athletes did not know the test, being at the beginning of their learning process.

• second distance – the pallina was placed at 12.20 m (Table 2):

Table 2. Results obtained by athletes for the pallina placed at 12.20 m

Athlete	IT	InT	FT
1	1196	980	560
2	444	1192	917
3	268	466	396
4	1020	552	655
5	267	205	636
6	1091	760	671
7	1097	511	889
8	211	564	269
9	516	779	897
10	268	632	745
11	2707	1181	857
12	317	499	892
13	416	552	900
14	771	879	820
15	140	237	417
16	738	295	813
17	248	816	686
18	530	463	956
19	795	311	508
20	286	592	657

Source: Authors' own conception

Regarding the results for the 12.20-m test, the arithmetic mean obtained by athletes in the initial test is equal to 666.3 cm. In the intermediate test, they obtained an arithmetic mean of 623.3 cm, while in the final test, their arithmetic mean was 707.05 cm. A difference of 43 cm is found between the initial test and the intermediate test. Between the initial test and the final test, the difference is 40.75 cm in favour of initial testing.

- the arithmetic mean obtained by athletes in the IT = 666.3 cm
- the arithmetic mean obtained by athletes in the InT = 623.3 cm
- the arithmetic mean obtained by athletes in the FT = 707.05 cm
- standard deviation for the results obtained in the IT = 571.16
- standard deviation for the results obtained in the InT = 276.58
- standard deviation for the results obtained in the FT = 192.43

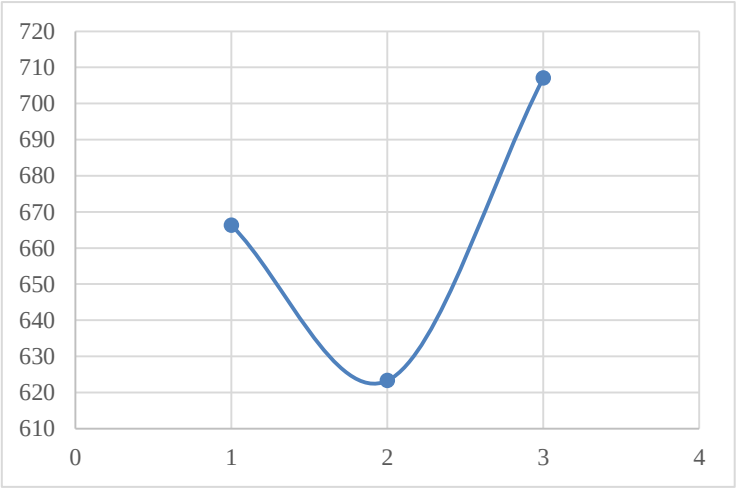


Figure 2. Evolution of the results expressed by the arithmetic mean for the pallina placed at the distance of 12.20 m
Source: Authors' own conception

For the distance of 12.20 m, the best performance was achieved in the second (intermediate) test (Figure 2). The results obtained showed that the balls were placed closer to the pallina than in the initial test. Thus, we can realise that our intervention has been effective, athletes with intellectual disabilities consolidating their bocce technique.

In the final test, the results obtained by our athletes were poorer compared to other tests. This is a normal aspect for our athletes, which is also mentioned by Teodorescu et al. (2007).

• third distance – the pallina is placed at 15.24 m (Table 3):

Table 3. Results obtained by athletes for the pallina placed at 15.24 m

Athlete	IT	InT	FT
1	324	375	478
2	1509	1406	624
3	350	695	626
4	1001	197	820
5	308	381	414
6	650	504	570
7	600	314	540
8	287	398	383

9	2310	856	1032
10	321	530	300
11	1097	810	781
12	664	897	519
13	369	520	880
14	1014	444	942
15	119	219	580
16	968	900	110
17	352	636	618
18	530	463	956
19	387	500	875
20	459	317	824

Source: Authors' own conception

Regarding the results for the 15.24-m test, the arithmetic mean obtained by athletes in the initial test is equal to 680.95 cm. In the intermediate test, they obtained an arithmetic mean of 568.1 cm, while in the final test, their arithmetic mean was 643.6 cm. A difference of 112.85 cm is found between the initial test and the intermediate test. Between the initial test and the final test, the difference is 37.35 cm in favour of final testing.

- the arithmetic mean obtained by athletes in the IT = 680.95 cm
- the arithmetic mean obtained by athletes in the InT = 568.1 cm
- the arithmetic mean obtained by athletes in the FT = 643.6 cm
- standard deviation for the results obtained in the IT = 507.77
- standard deviation for the results obtained in the InT = 283.72
- standard deviation for the results obtained in the FT = 236.37

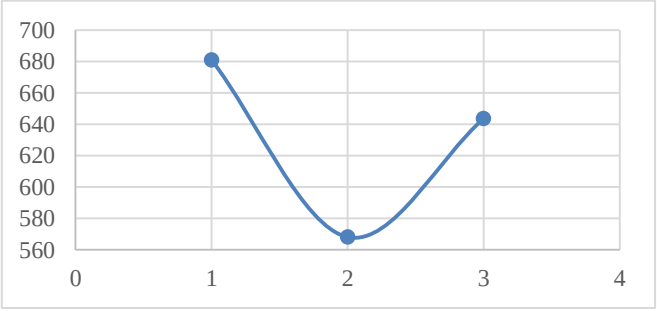


Figure 3. Evolution of the results expressed by the arithmetic mean for the pallina placed at the distance of 15.24 m
Source: Authors' own conception

The results achieved in the final test (Figure 3) are poorer than in the second (intermediate) test. It is also noticed that the arithmetic mean obtained in the final test is lower than the arithmetic mean obtained in the initial test. In this case too, the balls were placed far away from the pallina. This aspect is often encountered in the learning process of people with disabilities, being also reported by other studies (Bălan et al., 2019).

Discussion

The article complements existing information about the bocce training to athletes with disabilities. This approach can be used by other specialists and adapted to the characteristics of gender, age, type of disability, development level of fitness components, etc., all of which decisively leave their mark on the manner and length of time necessary for athletes to train. Moreover, the present study can be further developed, which will provide new learning opportunities for athletes with disabilities, but also for the specialists who work with them, their parents and the other specialists who are close to them.

People with intellectual disabilities can also participate in sports competitions organised for this category of disability. The preparation for participation in competition is based on training lessons that include the various training components structured in such a way that the athlete is provided with the skills and knowledge necessary to participate in competition, where they have to manage on their own. Throughout these lessons, the training components must be adapted to the athletes' real capabilities. All of them must be present in the sports training and be practiced from the first lesson; the correct movement and the transmission of accurate theoretical information should be at the forefront.

It should also be considered that the training of these athletes aims to help them overcome their own limits in terms of motor skills rather than achieving a certain result or performance. The training must be done based on the means preferred by athletes with intellectual disabilities, the means that arouse their interest (Mujea et al., 2019) and permanently capture their attention.

The coach should not forget that the participation, communication and integration of athletes with disabilities among peers who are not disabled or suffer from other disabilities (Pagnoni, 2010) has significant effects on learning. But the learning process is different from one athlete to another. There are periods when the acquisitions occur at a pace similar to that of athletes without disabilities. This pace alternates with periods of stagnation and even regression (Bălan et al., 2019). However, permanent

external stimulation (Braneț, 2016a) leads to important acquisitions on all levels.

Once athletes with intellectual disabilities have mastered the targeted sport-specific skills, it would be good for them to be integrated into groups along with non-disabled athletes who accept them and practise with them. An example of such a sport is bocce, which promotes inclusion because it allows the formation of teams in which athletes with and without disabilities compete together. This fact minimises the possible differences related to the level of acquisition of the technique (Pan & Davis, 2015). Moreover, participation in competition provides volunteers, spectators and others with the opportunity to notice the abilities of athletes with intellectual disabilities instead of seeing only their inabilities/inexperience or impossibility to achieve certain things.

The tests specific to the bocce divisioning stage must also be given importance during training lessons. The coach should place emphasis on both the learning of the specific technique and the development of conditional and coordination motor skills, which have their importance during competitive games (both during the divisioning stage and in the final competition).

Establishing tests during training lessons is beneficial and stimulates the participation of athletes with intellectual disabilities. Also, the fact that they are similar to competition tests stimulates them, makes them more attentive, increases their level of involvement and improves the throwing accuracy (Mujea et al., 2019). The results obtained by our athletes are not spectacular and alternate from one test to another, but this is often noticed in athletes with intellectual disabilities.

Conclusion

Assessing the level of acquisition of the technique is essential in the athletic training. In competitions, the level of acquisition of the technique allows athletes to compete with partners who have the same motor level. In this way, an attempt is made to eliminate differences within a value group and stimulate correctness in the divisioning test.

The results obtained by the athletes involved in our study differ from one test to another but also from one distance to another. The learning process must be continued for a long time. Practising the events included in the bocce divisioning test during training lessons must be done systematically. Any result should be accepted and appreciated as such,

especially since, for this category of athletes, it is not the result that matters but overcoming their movement limitations.

Authors' Contributions

All authors have equally contributed to this study and should be considered as main authors.

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