

Normal people's capacity of adjustment on a wheelchair basket: A preliminary study

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ABSTRACT

The purpose of this work is to show the execution and the results of a study aimed at identifying and defining the level of the normal people's capacity of adjustment on a wheelchair. This study is based on an hypothesis of a readaptation of a sport's rules of basketball. The new regulation created supposes the contemporary participation of normal people and disabled people and it establishes the use of wheelchairs regardless the physical condition and performance. All of this has been decided to minimize possible physical differences. Consequently, the study was conducted on some young basketball athletes to achieve the intended goal. The chosen athletes are member of an under 15 regional championship. The test administered to them includes some time and precision exercises based on the main fundamentals of basketball, executed on a wheelchair. The test's administration took place in three days to judge the speed of adaptation and learning of using this new tool. The sample group seemed available and open to this first approach with a mobile device used mainly by disabled people, but the results of the study done weren't positive. So, the 30% of the group has provided excellent results and it has been able to perform the test discreetly, improving each time. On the other hand, the remaining 70% observed many problems, worsening their performance in the last drills. **Keywords:** Disabled athletes; Physical adapted activity; Testing.

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INTRODUCTION

The study considered is based on the hypothesis of a readaptation of basketball's rules (Martino et al., 2019), to allow normal people and disabled people to play at the same time. To do this, a new technological instrument has been planned: a wheelchair characterised by the presence of special sensors, which favour the translocation in space simply through the displacement of the centre of gravity of the athlete, favouring every single disability (Di Tore et al., 2012) and so to improve the health status (Tiziana et al, 2017, Gaetano, 2016). The assessment is the main issue to evaluate (D'Isanto et al., 2019, Altavilla et al, 2018b, Raiola, D'Isanto, 2017b), including technical skills (Altavilla et al, 2018a, Raiola, D'Isanto, 2017b, Raiola, 2015) because is the basis of scientific identity of exercise and sports sciences training (D'elia, 2019, Sanseviero et al, 2019, Ceciliani, 2018, D'Elia et al, 2018, Raiola et al., 2018, Raiola, 2017, Raiola, Di Tore, 2017, Ceciliani et al, 2005).

As a result, the proposed study aims to observe and evaluate the adaptability of young athletes with a wheelchair, a characterizing element of the regulation taken into account. (Fay et al., 2013).

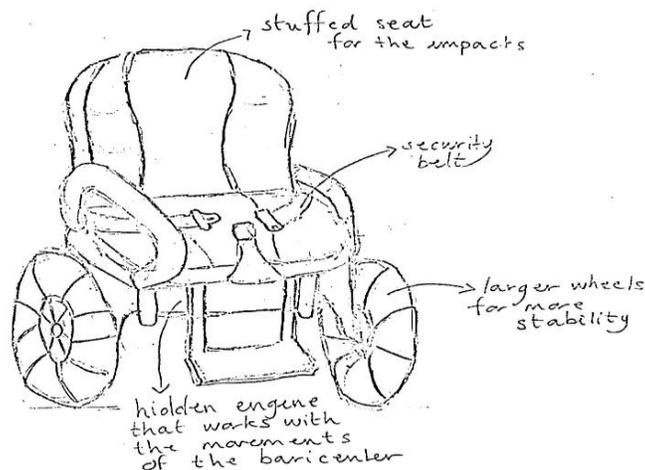


Figure 1. Wheelchair prototype with hoverboard sensors.

METHODS

Sample of subjects

This work was carried out mainly on a heterogeneous sample of 10 young athletes U15 entered in a regional championship, through the use of a basketball court, a basket and a ball with regulations and above all, of a wheelchair.

Procedures

The data were taken in two different periods on four weeks (at the start of the first week and after one month), in order to verify an improvement or a worsening of the performance on the wheelchair. These data are related to the execution of some exercises on the main fundamentals of basketball: shooting, dribbling and passing. All players were informed of all the procedures and they have voluntarily participated in this research.

Statistical analysis

The analysis covered basic statistics and percentages for the categories considered. The normality of data distribution was verified with Kolmogorov-Smirnov test. T-test was used to show the significant differences between before and post training. The significance level was set at $p < 0.05$. Statistical analyses were carried out with the software «IBM SPSS23». (Di Tore et al., 2013).

RESULTS

As far as shooting is concerned, the proposed exercise is to carry out the basic of shooting from five different locations within the three point line, giving each athlete five attempts for each of them (25 total throws). The positions (Fig. 2) planned were: angles, free throw extensions and free throw. (Schwark et al., 2004).

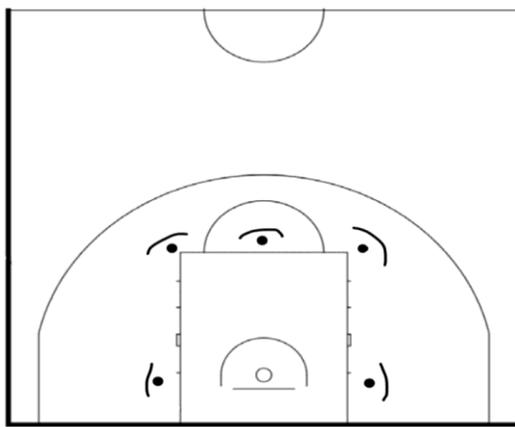


Figure 2. Positions of shooting.

Despite being well prepared on the fundamental considered, the athletes have found a few difficulties in the execution to be seated. In table 1, the data taken have shown the complexity of the test. Only some athletes were able to improve from the standpoint of realization, the others have continued to experience the same difficulties "Initial". The table below show the throws made on the 25 attempts available.

Table 1. Results of the shooting test

SHOOTING	Initial	Final (after one month)
Athlete 1	8/25	10/25
Athlete 2	2/25	2/25
Athlete 3	4/25	3/25
Athlete 4	5/25	3/25
Athlete 5	0/25	5/25
Athlete 6	1/25	0/25
Athlete 7	6/25	2/25
Athlete 8	2/25	7/25
Athlete 9	1/25	0/25
Athlete 10	3/25	1/25
Total	32/250	33/250

Table 2. Difference throws made between pre (initial) and post (final)

	T-test				t	gl	Sign. (with two tails)	
	Average	Dev. std.	Average standard error	Confidence interval of the difference of 95%				
				Lower				Higher
VAR01 VAR02	-.10000	2.99815	.94810	-2.24475	2.04475	-.105	9	.918

The significance level was set at $p < 0.05$.

Instead, as regards the fundamental of the dribble, they were given a test based on the time. It involves a work on a half-field, in which the athlete makes a zigzag path around the Kinsians (shown in yellow in the drawing), dribbling once every two pushes of the wheelchair. Then, once he has reached the middle of the field, he makes a change of direction and pushes quickly to conclude to the basket. (Altavilla, Raiola, 2015).



Figure 3. Time path in dribble.

The difficulty found in this test was having to push and direct the wheelchair as quickly as possible while being able to dribble. Even in this second exercise, only a small part of the sample was able to optimize the use of the wheelchair.

The results shown in table 3 are expressed in minutes and seconds.

Table 3. Results of the dribbling test

Dribbling	Initial	Final (after one month)
Athlete 1	1'49"	1'45"
Athlete 2	1'55"	1'56"
Athlete 3	1'59"	2'06"
Athlete 4	2'00"	2'10"
Athlete 5	1'44"	1'41"
Athlete 6	2'04"	2'12"
Athlete 7	1'53"	1'56"
Athlete 8	1'39"	1'33"
Athlete 9	1'37"	1'41"
Athlete 10	1'38"	1'45"

Table 4. Difference dribbling between pre (initial) and post (final)

	T-test				t	gl	Sign. (with two tails)	
	Average	Dev. std.	Average standard error	Confidence interval of the difference of 95%				
				Lower				Higher
VAR01 VAR02	-.06700	.15129	.04784	-.17523	.04123	-1.400	9	.195

The significance level was set at $p < 0.05$.

Then, the last proposed test was related to another fundamental of basketball, the passing.

The type of passing taken into account is the two-handed chest pass. The exercise predicts that the player with the wheelchair and the ball is in the guard position, while the other athlete in low post.

The first one will have to carry out exactly three passes to the chest to the companion that will move in three different positions: low post and in forward. (Oudejans et al., 2012).

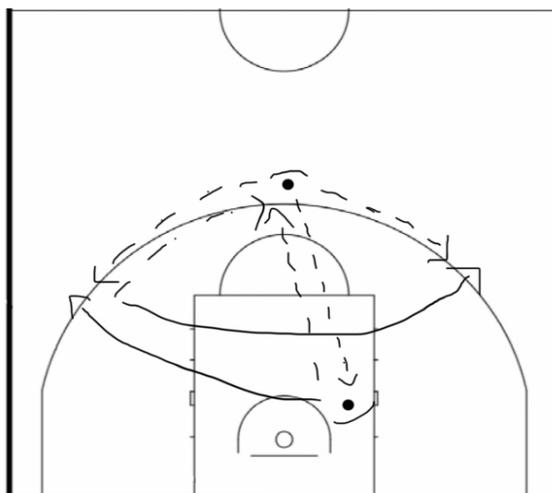


Figure 4. Dotted line: passing; continuous line: movement without ball

The results obtained from this last test were rather similar to the previous ones.

Most of the sample showed significant problems in dosing the force in the two-handed chest pass. In fact, the fundamental done from the majority of the athletes was particularly short.

In some cases, the ball did not reach at all the second player involved in the test, or at most, the passage was so weak that it dropped only at the feet of the companion. Some athletes tended to lean their feet on the ground to be able to give a greater thrust to the ball, cancelling the attempt to pass. As can be seen from Table 5., which shows the number of successful passes per player, only a fraction of the sample has been able to improve and understand the right technique to make a discreet transition.

Table 5. Results of the passing test

Passing	Initial	Final (after one month)
Athlete 1	2/3	3/3
Athlete 2	1/3	1/3
Athlete 3	0/3	0/3
Athlete 4	2/3	1/3
Athlete 5	3/3	3/3
Athlete 6	3/3	1/3
Athlete 7	2/3	1/3
Athlete 8	1/3	3/3
Athlete 9	1/3	1/3
Athlete 10	2/3	1/3
Total	16/30	15/30

Table 6. Difference passing between pre (initial) and post (final)

	T-test					t	gl	Sign. (with two tails)
	Average	Dev. std.	Average standard error	Confidence interval of the difference of 95%				
				Lower	Higher			
VAR01 VAR02	.20000	1.13529	.35901	-.61214	1.01214	.557	9	.591

The significance level was set at $p < 0.05$

CONCLUSIONS

The outcome of the study it has been enough negative, that is confirmed from the three T-test realized and shown in the tables 2, 4 and 6. Only the 30% of the sample studied was able to approach positively to a tool that it never used, such as the wheelchair. However, it is important to highlight that athletes who have achieved positive results have been the same in the three trials proposed. The players who, in fact, make up the 30% above are those who physically and technically turn out to be higher than the rest of the group of athletes.

Therefore, at the end of this study, it has come to the conclusion that the adaptability of young able-bodied athletes is particularly limited, if the attention is not focused on a work exclusively carried out on a wheelchair but regarding all instruments for disabled athlete. (Cassese, Raiola, 2017, Trallesi et al., 2009).

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