SPORT TK-EuroAmerican Journal of Sport Sciences

https://revistas.um.es/sportk Online ISSN: 2340-8812

Received: **03/09/2021.** Accepted: **31/10/2021.** Published: **27/03/2022**

Effect of combined exercises on mental, physical, and dribbling skills in young wheelchair basketball players

Ahmed Amer Mohammed Ali[1]*, Aqeel Hameed Oudah Al-Oudah[2]

1 Department of Students Activities, Babylon University, Iraq.

2 International Relations and Cooperation Dept. Ministry of Youth and Sports, Iraq.

* Correspondence: Dr. Ahmed Amer Mohammed Ali; ahmed.alfares@uobabylon.edu.iq

ABSTRACT

Wheelchair basketball is one of the sport that plays a significant role in the rehabilitation of individuals with special needs. Players must have a high degree of speed and focus their attention on different perceptual situations in the field. A total of 10 players were selected as sample from the Paralympics Subcommittee in the Babylon Province. They were randomly divided into experimental and control groups. After conducting the pre-tests, the combined exercises prepared by researchers were applied to the experimental group. These exercises were given to the experimental group in sessions of 30 minutes, three days per week. The control group followed the traditional curriculum. After conducting the post-test, the data were processed using the SPSS. The results indicated that the combined exercises positively contributed to the development of mental, physical, and dribbling skills of the wheelchair basketball players. Therefore, the authors recommend to include these combined physical exercises in the training curricula.

KEYWORDS

Combined exercises; mental skills; physical skills; dribbling.

1. INTRODUCTION

The modern world is witnessing scientific progress in all basic aspects of life. Sport directly interacts with other sciences to prepare the player based on scientific rules paving the process of arrival in a systematic and orderly manner according to contexts and laws that enable the player to reach the higher levels and take steps. In this way, they set plans that clarify methods of achieving it.

This requires the development of redoubled efforts in finding all new and innovative modern scientific means for success, development, and higher achievements.

Wheelchair basketball is a Paralympic sport that has increased in popularity worldwide in recent years, played by individuals with various disabilities such as spinal cord injury, polio, cerebral palsy and amputation. This sport is characterized by various high-intensity skills such as wheelchair manoeuvring and ball handling (Coutts, 1992). So, is one of the important sports as it leads to the rehabilitation of individuals with special needs from a mental and physical point of view. It is one of the best and most influential means in the speed of their return to society and their familiarity again. Wheelchair skills may include pushing, moving, stopping and changing the direction of the wheelchair, and these skills require physical abilities. It may also include handling the ball through shooting, handling, bluffing and dribbling with simultaneous wheelchair control during play (Tupling et al, 1986).

Practising sport and training is not limited to people with special needs to qualify them socially only but, also involves practising games and events, whether individual or collective, in a competitive manner of high achievement. The dribbling skill by changing the direction of the wheelchair basketball players require a quick reaction according to the different requirements and conditions of the game. It is necessary to make effort and invest time to master this skill and increase its accuracy through the development of physical and mental capabilities. Mental skills can be learned and acquired. The player's mind is programmed on this basis to respond according to that programming as it gives a reflection of all the experiences that the player has acquired and perceived. The player is in constant need of sensory information that helps in a continuous correction and isolation of stimuli, movements, and errors that increase the time of implementation of the responses. Thus, it does not achieve its goal, which is the speed in the performance and the optimal choice of a professional form (Sheppard et al, 2006).

The outcome of the match also depends on the extent of the development of the athlete's special physical abilities with the requirements of the sport under the conditions accompanying it. Therefore, mental skill is important in building perceptual images through senses. Players must possess a high degree of speed and focus their attention on the different perceptual positions on the playing field. There is a movement towards the ball and the movement of the player using the wheelchair, the plans of the opposing team, the coach, the audience, the limits of play, the rule and the law of the game and other various stimuli, on the one hand. On the other hand, there must be a great focus on the physical aspects, as they are closely related to the possibility of implementing the skills without dispersal of programming the skill and its accurate implementation in different playing

conditions (Laith, 2009). This aspect determines the performance of the skill. The two researchers noticed that there is a weakness in the mental and physical skills that negatively affect the performance of the dribbling skill by changing the direction for this important group of young players in wheelchair basketball. The researcher main focus was to see the effect of combined exercises in developing mental, physical and dribbling skills by changing the direction of young wheelchair basketball players.

2. METHODS

2.1. Participants

The participants of this study were 10 young players of the Paralympics Subcommittee in Babylon. The participants were divided into two groups (experimental and a control group). The researchers used the experimental approach to design the two equal groups with pre and post-tests to suit the nature of the problem and achieve the research objectives. To ensure the equivalence of the two groups, the two researchers used Mann-Whitney U Test, which showed that there were no significant differences between the two groups, as shown in Table 1.

Table 1. The equivalence of the two research groups

Variables		**Unit**	**Experimental**		**Control**		**Value of Mann – Whitney**	**Significance level**
			Mean	**SD**	**Mean**	**SD**		
Mental skills	Perception	Degree	13.40	1.52	12.80	1.92	11.500	0.84
	Self confidence	Degree	12	1.58	12.20	1.48	11.500	0.84
	Dealing with anxiety	Degree	11	1.58	11.20	1.48	12.500	1
	The ability to focus	Degree	12	1.58	12.80	1.30	8.50	0.42
	The ability to relax	Degree	10.20	1.30	11.40	1.51	6.500	0.22
	Motivation	Degree	14.80	0.83	13.80	0.83	5	0.10
Rapid strength test for arms and shoulder muscles		Degree	19.93	0.03	19.92	0.03	6	0.17
Arm strength and shoulders test		Degree	7.28	0.25	7.42	0.31	8	0.34

Dribbling test by changing direction	Degree	16.04	0.20	16.14	0.15	9		0.45

2.2. Instruments

The tools and devices used in this study were: a basketball court, 10 basketballs, 5 coloured magic pens, 10 coloured adhesive tapes, a linen measuring tape of 20 m length, 2 Chinese stopwatches, questionnaire, data dump form, medicine balls of 1,3 and 5 kg, smooth wall, HP laptop of Korean origin, 4 Eye protectors, different weights, weighted arm adhesive, dark coloured cloth pieces, 16 pieces for blindfolds, 4 ropes with a diameter of 1 cm and a length of 10 m, 8 rubber ropes of 1 cm in diameter of various lengths, 2 hand calculators (Casio), wheelchairs of Italian origin, two Fox whistles of Chinese origin, and a video camera (Sony). Furthermore, personal interviews and observation techniques were used to collect the data.

We used the Higher Mental Processes Scale described by Bahi & Jad (2004). This scale is a mental skills questionnaire that was designed by Stefan Bell Bull, John Albinson, and Christopher Shambrook (1996) to measure some important mental and psychological aspects of the athletes performance. This scale measures six dimensions: ability to visualize attention, self-confidence, ability to relax, ability to cope with anxiety, and motivation for athletic achievement. It includes 24 items, as each dimension has six items. The scale gives scores for the positive answers, including (6.5.4.3.2.1). The scores of each dimension are collected separately. The closer the coach's score to the highest score of 24 in each dimension, the more it indicates the distinction of the characteristic that the dimension measures. The smaller the player's scores, the more it indicates that this is a characteristic of further training in mental skill measured by this dimension.

We also used the following standardized and valid tests: 1) The velocity force of the arms and shoulder muscles (Hamdan, 2003). 2) The test of bending and extending the arms on the bar to the point of fatigue (upper tension) (Hamdan, 2003). 3) The dribbling skill and changing direction (Kadhim, 2006).

2.3. Procedures

Pre-tests: The two researchers applied the pre-tests in Hamzah Nouri Hall, in which the tests were conducted for mental and physical skills and the dribbling skill by changing direction.

Experiment: The main experiment was applied in Hamzah Nouri Hall, where the combined exercises prepared by the researchers were given to the experimental group over (30) minutes from the main part of the training unit three days a week. As for the control group, it applied the curriculum prepared by the trainer. The two researchers adopted some mental and physical skills on the integrated applications of the combined exercises to increase the effectiveness and the ability to visualize, especially with the category of young basketball players on wheelchairs. After that, the exercises prepared to develop the mental and physical abilities and dribbling skills by the hanging direction with specific positions, distances, heights and specific areas to develop them among young people.

Post-tests: The post tests were applied to tests some mental and physical skills and the dribbling skills by changing direction for the two research groups on Hamza Nuri Hall.

2.4. Statistical analyses

The Statistical Package for the Social Sociences (SPSS) was used to analyze the research data. The following statistical techniques were used: arithmetic mean, standard deviation, percentage, Mann-Whitney Test (independent samples), and Wilcoxon Test (dependent samples).

3. RESULTS

The results of this study are presented in Tables 2, 3 and 4. Table 2 shows the values of the mean, standard deviation, and Wilcoxon test for the experimental group. Table 3 shows the values of the mean, standard deviation, and Wilcoxon test for the control group. Table 4 shows the values of the mean, standard deviation, and Mann-Whitney test for the post-tests of the two research groups

All variables significantly improved from pretest to posttest, in both the experimental group (Table 2) and the control group (Table 3). However, in all variables the results were significantly better in the experimental group (Table 4).

Table 2. Values of the mean, standard deviation, and Wilcoxon test for the experimental group

Variables		**Unit**	**Pre- tests**		**Post-tests**		**Value of Wilcoxon**	**Significance level**
			Mean	**SD**	**Mean**	**SD**		
Mental skills	Perception	Degree	13.40	1.51	16.80	1.30	2.07	0.03
	Self confidence	Degree	12	1.58	17	1	2.04	0.04
	Dealing with anxiety	Degree	11	1.58	14.60	1.14	2.06	0.03
	The ability to focus	Degree	12	1.58	16.20	0.83	2.03	0.04
	The ability to relax	Degree	10.20	1.30	14.40	1.14	2.12	0.03
	Motivation	Degree	14.80	0.83	17.20	1.30	2.06	0.03
Rapid strength test for arms and shoulder muscles		Degree	19.93	0.03	19.83	0.01	2.04	0.04
Arm strength and shoulders test		Degree	7.28	0.25	9.44	0.42	2.03	0.04
Dribbling test by changing direction		Degree	16.04	0.20	19.20	0.44	2.02	0.04

Table 3. Values of the mean, standard deviation, and Wilcoxon test for the control group

Variables		**Unit**	**Pre-tests**		**Post-test**		**Value of Wilcoxon**	**Significance level**
			Mean	**SD**	**Mean**	**SD**		
Mental skills	Perception	Degree	12.80	1.92	14.40	1.67	2.06	0.03
	Self confidence	Degree	12.20	1.48	13.80	1.92	2.12	0.03
	Dealing with anxiety	Degree	11.20	1.48	12.80	1.09	2.06	0.03
	The ability to focus	Degree	12.80	1.30	14.20	1.30	2.07	0.03
	The ability to relax	Degree	11.40	1.51	12.40	0.89	1.63	0.04

	Motivation	Degree	13.80	0.83	14.60	1.14	2	0.04
Rapid strength test for arms and shoulder muscles		Degree	19.92	0.03	19.90	0.02	2.06	0.03
Arm strength and shoulders test		Degree	7.42	0.31	8.02	0.013	2.03	0.04
Dribbling test by changing direction		Degree	16.14	0.15	17.44	0.36	2.03	0.04

Table 4. Values of the mean, standard deviation, and Mann-Whitney test for the post-tests of the two research groups

Variables		**Unit**	**Experimental**		**Control**		**Value of Mann – whitney**	**Significance level**
			Mean	**SD**	**Mean**	**SD**		
Mental skills	Perception	Degree	16.80	1.51	14.40	1.67	3	0.04
	Self confidence	Degree	17	1	13.80	1.92	1	0.01
	Dealing with anxiety	Degree	14.60	1.14	12.80	1.09	3	0.04
	The ability to focus	Degree	16.20	0.83	14.20	1.30	1.50	0.01
	The ability to relax	Degree	14.40	1.14	12.40	0.89	1.50	0.01
	Motivation	Degree	17.20	1.30	14.60	1.14	1	0.01
Rapid strength test for arms and shoulder muscles		Degree	19.86	0.01	19.90	0.02	2	0.02
Arm strength and shoulders test		Degree	9.44	0.42	8.02	0.13	0.00	0.00
Dribbling test by changing direction		Degree	19.20	0.44	17.44	0.36	0.00	0.00

4. DISCUSSION

The main findings from the study indicate that combined exercises helped the young players increase their ability to visualize the performance of movement, which was the result of the scientific

applications of exercises and the accuracy in their performance. These young players felt the tension and muscle contraction before participating in the competition. They cannot focus their attention, especially in tough matches, and they often felt lacking confidence in matches. This lack often haunts them with a constant annoyance, especially when they make a mistake during the competition feeling not doing the utmost effort. Exercises also helped to develop the ability to cope with anxiety, arousal and calmness. Anxiety has one of the most important psychological phenomena associated with organizing competitions in sports. It plays an important role in the performance and role of coaches as a result of their aspirations to win the match and not to lose (Al-Sayyed, 1993).

In one study about strength training in wheelchair users, the participants were aimed to rehabilitate and cope with the challenges of life with a focus on fitness level and increase functional independence. In that study, training consisted of few intensity exercises with arm, kayak and wheelchair ergometers (Jacobs et al, 2001). In the present study we used compound exercises that are scientifically associated with the level of young players, so they were arranged and coordinated within the educational unit in a scientifically thoughtful manner. The exercises, the numbers of repetition, and the periods of rest were regularly sequenced, which was contributed to creating a set of functional adaptations. This set is appropriate for physical performance, including carrying performance according to strength endurance, which is the predominant characteristic of the activity. This activity requires an acceptable level of strength throughout the game of basketball on wheelchairs players, especially young people. It helps to develop strength in the shoulders and upper limbs. The use of combined exercises helped to develop the force characteristic of speed for the arms through specific repetitions with different stresses at the maximum speed that must be related to the performances and requirements of the practitioner. It is considered one of the important factors for the development of strength that is distinguished by speed as the type of force characterized by speed always depends on the type of sport practised with its requirements. So, training is aimed at improving the level of sports performance within the same game (Majeed, 1995).

The effect of relaxation exercises performed between strength exercises is characterized by velocity in the periods of rest. The same happens between the group's works to accelerate the process of recovery and increase the effects of exercises prepared for strength with speed, "when performing strength exercises with speed during the performance. Muscle extension plays a big role in the contraction itself because the force that arises in the case of muscle contraction increases and improves as the preliminary extension (Hassanain & Maani, 1998).

Combined exercises for 60 min from the main part of the training helped in the adaptation of the players' functional devices. This adaptation occurs due to the exercises used to develop strength endurance, which indicates that the exercises used have an effective role to develop physical abilities. Abu Al-Ela believes that strength endurance exercises help to maintain a high level of strength for the longest possible period. This is to face fatigue and perform the largest possible number of repetitions of muscle contraction exercises for the longest possible external resistance at a high level of strength (Ahmed, 1997).

Differences in adaptations may be the different training experiences of players. using a 7-week low-intensity (30% of maximum heart rate) hand rim wheelchair training in 10 able-bodied participants. Although these researches reported a 31.2% increase in sprint power, this improvement may be related to the fact that the participants were sedentary and did not have wheelchair experience use before the study. In a study, the control group consisted of trained (WCB) athletes. This explains the results are significant differences between the post-test of the experimental and control groups in the dribbling skill in changing direction. Researchers attribute this to the effect of the prepared exercises, which included various exercises to develop the dribbling skill by changing direction. The performance of the exercises, the movement of changing the direction of the wheelchair with or without a ball and the practice of these exercises lead to the development of this skill. Physical exercises and uses of weights in training of strength, speed, and endurance help in the growth and improvement of the accuracy of skills (Gorgis, 1998).

5. CONCLUSIONS

In conclusion, combined exercises improve mental, physical, and dribbling skills of young wheelchair basketball players. For this reason, training programs of combined exercises like the one used in this study may be advised to improve competition performance in young wheelchair basketball players.

6. REFERENCES

1. Ahmed, A. (1997). *Sport training of physiological foundations.* Al-Fikr Al-Arabi Press House, Cairo.
2. Al-Sayyed, A. (1993). *Studying the relationship between competitive anxiety and some psychological stress sources for young football players.* Conference of Physical and Sport

Education in the Arab Homeland, Faculty of Physical Sciences for Boys, University of Halwan, Cairo, Egypt.

3. Angilan, J. (2021). Differentiated Instruction and Students Literary Competence: An Experimental Study. *Middle Eastern Journal of Research in Education and Social Sciences, 2*(2), 110-125. https://doi.org/10.47631/mejress.v2i2.230
4. Bahi, M., & Jad, S. (2004). *The entrance to modern trends in sport psychology.* Dar Al-Aalamiah for publishing.
5. Coutts, K. D. (1992). Dynamics of Wheelchair Basketball. *Medicine and science in sports and exercise, 24*(2), 231-234.
6. Dabesa, F., & Cheramlak, S. F. (2021). Practices, Opportunities, and Challenges Of SIP in Primary Schools of Ilu Gelan Woreda, West Shoa Zone, Oromia Regional State. *Middle Eastern Journal of Research in Education and Social Sciences, 2*(2), 58-84. https://doi.org/10.47631/mejress.v2i2.162
7. Davis, G. M., & Shephard, M. D. (1990). Strength training for wheelchair users. *British journal of sports medicine 24*(1), 25-30.
8. Gorgis, M. (1998). *Handball between theory and application.* Al-Jabal Press House, Cairo.
9. Hamdan, A. (2003). *Placing testing battery to measure some skilful physical abilities in wheelchair tennis.* Master thesis, Faculty of Sport Sciences, University of Baghdad.
10. Hassanain, M. and Maani, A. (1998). *The encyclopedia of practical sport training, 1st edition.* Al-Kitab Center for Publishing, Cairo.
11. Jacobs, P. L., Nash, M. S., & Rusinowski, J. W. (2001). Circuit training provides cardiorespiratory and strength benefits in persons with paraplegia. *Medicine and science in sports and exercise, 33*(5), 711-717.
12. Kadhim, R. (2006). *Awareness of basketball and its role in aggressive performance.* Thesis, Faculty of Sport Sciences, University of Basra.
13. Laith, M. A. (2009). *The effect of endurance ability on the performance of some complex offensive skills in basketball in Baghdad (ages 16-18).* Master Thesis. College of Physical Education, University of Baghdad.
14. Majeed, R. (1995). *Applications in physiology and sport training.* Al-Noon office for printing, Baghdad.
15. Makhzoum, V., Komayha, L. & Jabbour, M. (2020). The role of critical thinking in helping students cope with problems. *Middle Eastern Journal of Research in Education and Social Siences, 1*(2), 198-217. https://doi.org/10.47631/mejress.v1i2.107

16. Parvathy, P. B. (2020). Challenging Misogyny on and off the Pitch: Analysis of Selected Sports Movies. *Middle Eastern Journal of Research in Education and Social Sciences, 1*(1), 45-52. https://doi.org/10.47631/mejress.v1i1.10
17. Sheppard, J., Young, W. B., Doye, T. L., Sheppard, T. A., & Newton, R. U. (2006). An evaluation of a new test of reactive agility and its relationship to sprint speed and change of direction speed. *Journal of Science and Medicine in Sport 9*(4), 342-349.
18. Tupling, S. J., Davis, G. M., Pierrynowski, M. R., & Shephard, R. J. (1986). Arm strength and impulse generation: Initiation of wheelchair movement by the physically disabled. *Ergonomics, 29*(2), 303-311. https://doi.org/10.1080/00140138608968266

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

FUNDING

This research received no external funding.

COPYRIGHT