Effect of coordination exercise on improving some locomotor and physical abilities and ease attention deficit hyperactivity disorder *within handicapped learnable children*

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Introduction:

Handicapped children have the right to live, development and education to be productive, like other society members. Mental disabilities have special nature and are not similar to any other disability due to its multiple aspects and the fact that society progress depends on mental competency of its members.

It is necessary to care with mentally retarded handicapped children ,work on investment their potentials, and ensure their adjustment with environment around them. It is also important to prepare them to integrate with community members, as well as giving attention to their own development, developing programs to suit their disability nature as basic human right for them and basic guide in raising these children and protect them from social isolation and inactivity life. (Nawasra, 2010, p .158, Special education general management, basic education general management, high education sector, Ministry of Education, 2003, p .34)

Therefore, physical education programs for this category are not different than others for normal pupils, but disability slow learning process; as well as that mentally handicapped pupils have weakness body mechanical performance, so attention should be given to physical and skill activities programs, as it help growth of motor, social, and psychological skills. (Nawasra, 2010, p .158)

Mentally disabled child cannot acquire a skill in same degree as normal children; it should be emphasized on learning basic motor skills such as right standing, walking, running, jump, as basic important movements to adapt to environmental. It don't require much cognitive aspects or high coordination between body parts; in same time it work ti increase locomotor and physical abilities level to improve muscle tone. It is highly possible that mentally disabled children get impaired physical and motor fitness compared to ordinary peers as a result of avoiding participation in motor activities. (Alhagrasy, 2002, p .220, Macintyre, 2002, p.117, Nawasra, 2010, p. 159).

Attention deficit hyperactivity disorder (ADHD) is of serious behavioral disorders in mental health field; which spread among ordinary children generally, and mentally handicapped in

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particular. It has negative effect on these children, and affect functionality, they face difficulty in self-control, and it impedes them from acquisition of basic skills necessary to adapt to environment (Abdullah, 2003, p.117, Aldesouqy, 2006, p.22, and Alsharif, 2014, p. 27).

ADHD is about children, adolescents and adults who exhibit behavioral patterns like lack attention, impulsivity, hyperactivity, where the child is permanently active to be subject of a complaint from others surrounding him (Aldesouqy, 2006, p.17, and Alqady, 2011, p. 23).

ADHD is a behavioral neurological disorder caused by brain-impaired function, affecting behavior, thoughts and emotions, and can be dealt with and alleviate its symptoms in order to help the child to learn and self-control (Mohammad, 2010, p .105).

ADHD symptoms appear in three types, first dominated by attention deficit symptoms more than hyperactivity and impulsivity, second dominated by both hyperactivity and impulsivity symptoms than attention deficit, and the third combines symptoms of attention deficit, hyperactivity and impulsivity together (Alkhashrany & EsSayed, 2009, p. 82, and Alsharif, 2014, p.28)

Diagnostic and statistical manual of mental disorders (DSM) indicates that prevalence of this disorder among children of school-age range between (3 and 7%), and the available data about ratio between adolescents and adults is very limited, and this percentage increases because of combining the disorder patterns (American Psychiatric Association, 2000, p .7).

ADHD is diagnosed through (personal interview with parents and child to know his behavior at home and school, the application of a set of standards which estimate behavior, obtain data from the school about the child's behavior and achievement tests marks, conducting a series of psychological tests and conducting medical examinations) (Aldesouqy, 2006, p.67, and Barkley, 2003, p .77-83).

While developing activity programs for this category, it should be based on what child acquire from basic motor skills; and give attention to big muscles coordination. Activity should characterized by speed and agility; any activity should take short time due to poor endurance, as well as giving interest to climbing, hung up, jump and running exercises and chase games, and train children on social and democratic relations through good example and direct guidance(Ibrahim, 2005, p .174 and Alsharif, 2014, p. 60).

Most of daily activities require coordination element, especially motor performance activities that use more than one body part in

more than one direction at same time, coordination depend on right coherence and complementarity between muscle and nervous systems to produce movement accurately and timely(Moghazi, 2010, p. 35)

Coordination is the individual's ability to coordinate movements different in shape and direction accurately and smoothly in one motor performance model (Abdulfatah, 1997, p14. and Abdul Khaliq, 2005, p.169). Coordination is associated with other physical abilities such as speed, agility and accuracy; it associates with speed in motor performance requirements in terms of time, and with agility and accuracy through spatial performance and moving the body and its parts with required accuracy (Abbas, 2005, p .205 and Ibrahim, 2007, p. 16).

Coordination can be developed through various exercises graduated in difficulty. Motor coordination cannot be developed and mastered correctly except after continuous repetitions so that nervous system be able to send mutual nerve signals between cessation and excitement for more than a muscle at the same time in different body parts (Essawi, 1999, p.35; Salama, 2000, p.17; Mahmoud & Qandil, 2005, p .16, and Ibrahim, 2007, p. 17).

Coordination is divided to nervous coordination (coupling between neural processes leading to solution of kinetic duties), muscle coordination (coordination between tension and relax of muscles to perform the movement), and motor coordination (coordination among body parties)(Abbas, 2005, p .25).

Researcher, through visits to intellectual education schools in Alexandria, found that ADHD is of the most important psychological and behavioral problems within children in general, and handicapped in particular, they represent a source of concern for school and the community. After reviewing motor programs offered to them, the researcher found that programs used are behavioral and guidance program to ease the disorder. They have no motor activity programs developed specially for them, but they use general motor activities and programs. Therefore, researcher thought that it is possible to use coordination exercises to improve locomotor and physical abilities and ease ADHD symptoms within handicapped children.

Research objective

Identify the effect of coordination exercise on improving some locomotor and physical abilities and ease attention deficit hyperactivity disorder (ADHD) within handicapped learnable children

Research Hypotheses:

- There are statistically significant differences between pre and post measurements of some locomotor and physical abilities within experimental group handicapped children in favor of post measurements.
- There are statistically significant differences between post measurements of some locomotor and physical abilities within experimental and control group handicapped children in favor of experimental group.

Research procedures:

Research Methodology:

Experimental approach used due to its appropriateness of research nature

Human domain:

This study performed on a sample of mentally handicapped pupils aged (9 and12) years; mental age between (8 and10) years and IQ score between (55 and 75).

Time domain:

Pilot study and pre measurements carried out in the period from 26/09/2015 to 08/10/2015, main experiment carried out in the period from 10/10/2015 to 16/15/2015, and post measurements in the period from 19/12/2015 to 23 / 12/2015.

Spatial domain:

Saad Zaghloul and Ikhlas intellectual schools, west educational directorate, Alexandria.

Research sample:

Main study sample selected intentionally and consisted of (24) mentally disabled students in Sadat school, divided into two equal groups each of (12) pupils, one experimental and one. Pilot study sample consisted of (12) mentally handicapped students.

Pilot studies:

First pilot study:

Aimed at:

- Determine appropriate tests to measure IQ, physical and locomotor variables, and ADHD within handicapped children.

This study has resulted in:

- Define IQ measure: Godanf test. (Alsharif, 2014, p. 27 and ALhussainy, 2010)
- Determine the physical and locomotor tests (Appendix 1)
- Selecting ADHD checklist from DSM IV, amended by Ahmed Alsharif, 2014, it made up of three aspects containing (32) phrases on quintuple response scale (appendix 2).

Second pilot study:

Aimed at ensure validity and reliability of research tools.

I-Validity:

Comparing highest and lowest quartiles used to ensure validity y applying tests on (12) pupils.

Table (1) Significance of differences between highest and the lowest quartiles in locomotor and physical tests

Statistical indicators / physical variables			Highest Quartile		Lowest Quartile		Mean difference	T
			Mean	±SD	Mean	±SD		
Flexibility		Trunk front flexion from long sitting test (cm)	-10.25	2.92	-5.25	1.96	-5.00	9.
speed		20 m running (second)	7.41	0.85	5.42	0.96	1.99	8.
agility		Zigzag running (seconds)	19.36	0.96	17.52	1.03	1.84	8.
coordination	Eye-hand coordination	Ball throw and receive within 30 seconds (number)	4.27	2.01	2.15	1.36	2.12	6.
	Eye-legs coordination	Numbered circles test (seconds)	12.43	0.89	8.71	0.72	3.72	14
Balance	Stability balance	Standing with feet on bar (seconds)	23.21	1.95	17.36	1.83	5.85	9.
	Moving balance	walking on Swedish bench (seconds)	9.15	0.74	5.62	0.84	3.35	11
Accuracy		Shooting on overlapped rectangles	4.17	0.86	3.31	0.76	0.86	6.
Locomotor	Time sense error 10		5.36		3.62	0.96	1.74	8

test	seconds (second)		0.42				
	Jump distance sense error 60 cm (cm)	12.32	0.87	6.57	0.84	5.75	17
	Compared visual sense error for walking distance 10m (cm)	60.14	1.71	49.79	1.27	15.35	25
	Compared visual sense error for walking direction 10m (cm)	37.32	1.69	31.26	1.82	6.06	10

* Significant at the 0.05 level = 2.23

Table (1) results reveal significant differences between highest and lowest quartiles as T value ranges between (6.764 and 25.774) values which is greater than T significant at 0.05 level. Validity coefficient ranged between (0.805 and 0.983), the matter which proof validity of physical and locomotor tests

Table (2) Significance of differences between highest and the lowest quartiles in ADHD checklist for learnable mentally disabled children

Statistical indicators / variables	Highest Quartile		Lowest Quartile		Mean difference	T	Validity coefficient
	Mean	±SD	Mean	±SD			
Attention Deficit	54.53	2.23	51.73	3.93	2.8	6.956 *	0.829
Hyperactivity	53.86	2.85	50.11	3.58	3.75	7.565 *	0.850
Impulsivity	49.12	2.25	44.25	2.03	4.87	10.586 *	0.914
Total	157.51	5.12	146.09	6.43	11.42	7.364 *	0.843

* Significant at the 0.05 level = 2.23

Table (2) results reveal significant differences between highest and lowest quartiles as T value ranges between (6.956 and 10.568) values which is greater than T significant at 0.05 level. Validity coefficient ranged between (0.829 and 0.914), the matter that proof validity of ADHD checklist

II-Reliability:

Correlation (Reliability) coefficient calculated using test/retest method on sample of 10 the sample scoping study and which are based on (12) pupils with 7 days interval between tests.

Table (3) Significance of differences between first and second tests of locomotor and physical tests (n=12)

Statistical indicators / physical variables			1st test		2nd test		Mean difference	Correlation (Reliability) coefficient
			Mean	±SD	Mean	±SD		
Flexibility		Trunk front flexion from long sitting test (cm)	-7.35	3.15	-7.23	2.98	-0.12	0.909
speed		20 m running (second)	5.65	1.04	5.37	0.96	0.28	0.842
agility		Zigzag running (seconds)	17.14	1.65	17.25	1.84	-0.11	0.912
coordination	Eye-hand coordination	Ball throw and receive within 30 seconds (number)	3.11	1.02	3.47	1.95	-0.46	0.856
	Eye-legs coordination	Numbered circles test (seconds)	8.15	0.88	7.98	0.76	0.17	0.915
Balance	Stability balance	Standing with feet on	23.19	1.98	22.56	1.87	0.63	0.924

		bar (seconds)						
	Moving balance	walking on Swedish bench (seconds)	6.89	1.13	7.24	0.95	-0.35	0.963
Accuracy		Shooting on overlapped rectangles	3.56	1.03	3.89	1.36	-0.33	0.902
Locomotor test	Time sense error 10 seconds (second)		3.53	0.85	3.24	0.76	0.29	0.921
	Jump distance sense error 60 cm (cm)		8.52	1.25	8.14	1.11	0.38	0.907
	Compared visual sense error for walking distance 10m (cm)		52.68	2.02	52.12	2.57	0.56	0.911
	Compared visual sense error for walking direction 10m (cm)		33.22	2.36	33.56	2.75	-0.34	0.932

* Significant at the 0.05 level = 0.576

Table (3) results reveal existence of statistically significant correlation between First and second application. R values ranged between (0.842 and 0.963), values which are higher than R significant at 0.05.

Table (4) Significance of differences between first and second administration of ADHD checklist for learnable mentally disabled children (n=12)

Statistical indicators / variables	1st test		2nd test		Mean difference	Correlation (Reliability) coefficient
	Mean	±SD	Mean	±SD		
Attention	53.02		52.92		0.1	0.995

Deficit		2.72		3.93		
Hyperactivity	52.64	3.24	52.25	3.58	0.39	0.925
Impulsivity	47.25	1.65	46.69	1.84	0.56	0.911
Total	152.91	6.73	151.86	7.68	1.05	0.945

* Significant at the 0.05 level = 0.576

Table (4) results reveal existence of statistically significant correlation between First and second application. R values ranged between (0.911 and 0.995), values which are higher than R significant at 0.05.

Statistical Analysis:

SPSS statistical program used to extract the following: Mean- standard deviation – skewness coefficient – Means difference – T - validity coefficient - reliability coefficient – variance coefficient.

Sample homogeneity

Table (5) overall research basic variables descriptive statistics sample before experiment n = 24

Statistical indicators / Basic variables	Mean	±SD	Skewness coefficient	Variance coefficient
Height (cm)	136.90	6.24	0.62	4.558
Weight (kg)	35.86	3.95	0.35	11.015
Age	11.35	1.14	0.53	10.044
Mental age	8.12	1.02	0.12	12.562
IQ	59.34	4.25	0.98	7.162

Table (5) results reveal skewness coefficients values between (0.12 and 0.98), values which is between ±3 and close to zero; the matter which confirms that sample is free of abnormal distributions defects. Results also reveal that variance coefficient for all basic variables for overall sample is less than 20%, which demonstrates homogeneity of sample individuals in basic variables before experiment.

Table (6) Significance of differences between experimental and control groups in basic variables before experiment

Statistical	Experimental	Control	Mean	T

indicators / Basic variables	group **(n=12)**		group **(n=12)**		difference	
	Mean	±SD	Mean	±SD		
Height (cm)	137.56	7.12	136.32	6.46	1.24	0.447
Weight (kg)	36.23	4.13	35.37	3.78	0.86	0.532
Age	11.02	1.19	11.64	1.05	-0.62	1.354
Mental age	8.02	1.15	8.35	1.36	-0.33	0.642
IQ	59.11	5.72	59.54	4.98	-0.43	0.196

* Significant at the 0.05 level = 2.074

Table (6) results reveal that differences between experimental and control groups in basic variables are not significant as T value ranges between (0.196 and 1.534) values which is less than T significant at 0.05 level, the matter that proof research group homogeneity in these variables

Table (7) Significance of differences between experimental and control groups in locomotor and physical tests before experiment

Statistical indicators / physical variables			Experimental group **(n=12)**		Control group **(n=12)**		Mean difference	T
			Mean	±SD	Mean	±SD		
Flexibility		Trunk front flexion from long sitting test (cm)	-7.18	3.52	-7.42	3.74	0.24	0
speed		20 m running (second)	5.31	0.64	5.02	0.82	0.29	0
agility		Zigzag running (seconds)	17.35	1.84	17.92	2.13	-0.57	0
coordination	Eye-hand coordination	Ball throw and receive within 30 seconds	3.25	1.73	3.61	1.41	-0.36	0

		(number)						
	Eye-legs coordination	Numbered circles test (seconds)	8.35	0.74	8.49	0.98	-0.14	
Balance	Stability balance	Standing with feet on bar (seconds)	22.63	2.02	21.98	1.95	0.65	
	Moving balance	walking on Swedish bench (seconds)	7.35	0.84	6.97	1.03	0.38	
Accuracy		Shooting on overlapped rectangles	3.29	0.97	3.43	1.21	-0.14	
Locomotor test	Time sense error 10 seconds (second)		3.21	0.26	3.11	0.32	0.1	
	Jump distance sense error 60 cm (cm)		8.78	0.96	8.35	0.89	0.43	
	Compared visual sense error for walking distance 10m (cm)		53.56	1.93	52.26	2.23	2.3	
	Compared visual sense error for walking direction 10m (cm)		33.54	1.95	34.26	2.36	-0.72	

* Significant at the 0.05 level = 2.074

Table (7) results reveal that differences between experimental and control groups in locomotor and physical tests are not significant as T value ranges between (0.157 and 1.523) values which is less than T significant at 0.05 level, the matter that proof research group homogeneity in these variables

Table (8) Significance of differences between experimental and control groups in ADHD checklist for learnable mentally disabled children

Statistical indicators / variables	Experimental group **(n=12)**		Control group **(n=12)**		Mean difference	T
	Mean	±SD	Mean	±SD		
Attention Deficit	53.65	3.18	53.16	3.57	0.49	0.257
Hyperactivity	52.68	2.96	52.87	2.67	-0.19	0.165

Impulsivity	48.39	2.24	47.98	1.93	0.41	0.480
Total	154.72	7.15	154.01	7.37	0.71	0.240

* Significant at the 0.05 level = 2.074

Table (8) results reveal that differences between experimental and control groups in ADHD checklist are not significant as T value ranges between (0.165 and 0.480) values which is less than T significant at 0.05 level, the matter that proof research group homogeneity in these variables.

Main study:

Coordination exercises training aiming at improve some locomotor and physical abilities and ease ADHD designed to be applied in ten (10) consecutive weeks, three (3) training units per week, each unit is 45 minutes, the study started by implementing the program as follows:

Experimental group:

Undergone training program consists of (30) training unit applied on (Saturday - Monday - Wednesday) each week.

Control group:

Undergone school motor syllabus in physical education classes on (Saturday - Monday - Wednesday) each week.

The proposed program:

Training unit components:

- **Warm-up**: duration (7) minutes, contains exercises in form of games aiming to muscles general preparation, stimulate blood circulation and prepare body joints for effort.
- **Main part**: duration (35) minutes, includes physical exercise.
- **Cool down:** duration (3) minutes, contains exercises to calm body and return to nearly normal state.

Program development foundations:

- Using low intensity interval-training method for developing physical abilities.
- Adopting load/rest principle as a training base.
- Load gradual rise.
- Right time for exercise repetition.
- Continuity in performing exercise and training. (Allawi, 1994, p12; Ahmed, 1999, p .288; and Abbas, 2005, p. 178-179)
- Taken into account when developing and implementing program exercises to be in form of gradual difficulty training unit.
- Each training unit included (3) warm-up exercises (for functional preparation) performed individually.

- Each training unit included (5) physical preparation exercises (to develop physical abilities).
- Each training unit included (2) cool down exercises
- (50: 70%) intensity from pupil maximum level while performing physical exercises. (Figure 1)

Week		1			2			3			4			5		
Unit		1	2	3	4	5	6	7	8	9	10	11	12	13	14	14
Load intensity	50 %		●													
	55 %	●		●		●	●					●			●	
	60 %				●				●		●			●		
	65 %							●		●			●			●
	70 %															

Week		6			7			8			9			10		
Unit		16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Load intensity	50 %		●													
	55 %	●									●					
	60 %				●			●		●					●	
	65 %			●			●					●		●		●
	70 %					●			●				●			

Figure (1) Load intensity distribution on weekly units

- The program contains exercises without tools, exercises using body as weight, exercises with tools (balls - seats - hoops- Sand bags - Wands).

Rationing exercise in terms of time:

- 50% of pupil maximum repetition calculated exercise performance. (Maximum repetition × 50/100).
- Maximum time for each exercise performance calculated for each exercise separately.
- Performance time for each exercise is (30) seconds, with (40: 45) seconds interval rest.

- The number of groups is (4) groups, and interval rest between groups is (2: 3) minutes.

• Results

Table (9) Significance of differences between experimental group pre and post measurements of locomotor and physical tests (n=12)

Statistical indicators / physical variables			Pre measurement		Post measurement		Mean difference
			Mean	±SD	Mean	±SD	
Flexibility		Trunk front flexion from long sitting test (cm)	-7.18	3.52	-1.12	2.43	-6.06
speed		20 m running (second)	5.31	0.64	4.12	0.79	1.19
agility		Zigzag running (seconds)	17.35	1.84	12.29	0.94	5.06
coordination	Eye-hand coordination	Ball throw and receive within 30 seconds (number)	3.25	1.73	8.56	1.52	-5.31
	Eye-legs coordination	Numbered circles test (seconds)	8.35	0.74	5.92	0.65	2.43
Balance	Stability balance	Standing with feet on bar (seconds)	22.63	2.02	30.56	2.15	7.93
	Moving balance	walking on Swedish bench (seconds)	7.35	0.84	5.49	0.62	1.86
Accuracy		Shooting on overlapped rectangles	3.29	0.97	6.14	1.93	-2.85
Locomotor	Time sense error 10		3.21	0.26	1.71	0.72	1.5

test	seconds (second)					
	Jump distance sense error 60 cm (cm)	8.78	0.96	3.36	0.95	5.42
	Compared visual sense error for walking distance 10m (cm)	53.56	1.93	37.68	1.58	15.88
	Compared visual sense error for walking direction 10m (cm)	33.54	1.95	23.23	2.31	10.31

* Significant at the 0.05 level = 2.201

Table (9) results reveal significant differences between experimental group pre and post measurements in locomotor and physical tests as T value ranges between (6.06 and 24.06) values which is greater than T significant at 0.05 level, with improvement percentage range between (22.41 and 163.38) in favor of post measurement in all variables .

Table (10) Significance of differences between experimental group pre and post measurements of ADHD checklist (n=12)

Statistical indicators physical variables	Pre measurement		Post measurement		Mean difference	T	Improvement %
	Mean	±SD	Mean	±SD			
Attention Deficit	53.65	3.18	37.19	3.76	16.46	11.97*	30.68
Hyperactivity	52.68	2.96	35.67	3.35	17.01	15.13*	32.29
Impulsivity	48.39	2.24	29.36	2.95	19.03	21.24*	39.33
Total	154.72	7.15	102.22	7.68	52.5	26.56*	33.93

* Significant at the 0.05 level = 2.201

Table (10) results reveal significant differences between experimental group pre and post measurements in ADHD checklist as T value ranges between (11.97 and 26.56) values which is

greater than T significant at 0.05 level, with improvement percentage range between (30.68 and 39.33) in favor of post measurement in all variables .

Table (11) Significance of differences between control group pre and post measurements of locomotor and physical tests (n=12)

Statistical indicators / physical variables			Pre measurement		Post measurement		Mean difference	T	Improvement %
			Mean	±SD	Mean	±SD			
Flexibility		Trunk front flexion from long sitting test (cm)	-7.42	3.74	-5.32	1.92	-2.1	3.73 *	28.30
speed		20 m running (second)	5.02	0.82	4.81	0.59	0.21	2.37 *	4.18
agility		Zigzag running (seconds)	17.92	2.13	16.93	0.85	0.99	3.5 *	5.52
coordination	Eye-hand coordination	Ball throw and receive within 30 seconds (number)	3.61	1.41	4.42	1.49	-0.81	3.37 *	22.44
	Eye-legs	Numbered	8.49	0.9	7.9	0.64	0.58	3.72 *	6.83

	coordination	circles test (seconds)		8	1				
Balance	Stability balance	Standing with feet on bar (seconds)	21.98	1.95	23.53	2.64	-1.55	3.63 *	7.05
	Moving balance	walking on Swedish bench (seconds)	6.97	1.03	6.74	0.85	0.23	2.59 *	3.29
Accuracy		Shooting on overlapped rectangles	3.43	1.21	4.02	2.14	-0.59	2.83 *	17.20
Locomotor test	Time sense error 10 seconds (second)		3.11	0.32	2.75	1.23	0.36	2.98 *	11.58
	Jump distance sense error 60 cm (cm)		8.35	0.89	6.93	1.78	1.42	4.49 *	17.01
	Compared visual sense error for walking distance 10m (cm)		52.26	2.23	43.23	2.17	9.03	11.85*	17.28
	Compared visual sense error for walking direction 10m (cm)		34.26	2.36	31.73	2.86	2.53	4.36 *	7.38

* Significant at the 0.05 level = 2.201

Table (11) results reveal significant differences between control group pre and post measurements in locomotor and physical tests as T value ranges between (2.37 and 11.85) values which is greater than T significant at 0.05 level, with improvement percentage range between (3.29 and 28.30) in favor of post measurement in all variables .

Table (12) Significance of differences between control group pre and post measurements of ADHD checklist (n=12)

Statistical indicators / physical variables	Pre measurement		Post measurement		Mean difference	T	Improvement %
	Mean	±SD	Mean	±SD			
Attention Deficit	53.16	3.57	46.36	5.12	6.8	4.15 *	12.79
Hyperactivity	52.87	2.67	48.86	4.75	4.01	2.65 *	7.58
Impulsivity	47.98	1.93	44.57	4.67	3.41	2.37 *	7.11
Total	154.01	7.37	139.79	8.42	14.22	3.16 *	9.23

* Significant at the 0.05 level = 2.201

Table (12) results reveal significant differences between control group pre and post measurements in ADHD checklist as T value ranges between (2.37 and 4.15) values which is greater than T significant at 0.05 level, with improvement percentage range between (7.11 and 12.79) in favor of post measurement in all variables .

Table (13) Significance of differences between experimental and control groups in locomotor and physical tests after experiment

Statistical indicators / physical variables		Experimental group **(n=12)**		Control group **(n=12)**		Mean difference	T
		Mean	±SD	Mean	±SD		
Flexibility	Trunk front flexion from	-1.12	2.43	-5.32	1.92	4.2	4.698*

		long sitting test (cm)						
speed		20 m running (second)	4.12	0.79	4.81	0.59	0.69	2.421*
agility		Zigzag running (seconds)	12.29	0.94	16.93	0.85	-4.64	12.678*
coordination	Eye-hand coordination	Ball throw and receive within 30 seconds (number)	8.56	1.52	4.42	1.49	4.14	6.743*
	Eye-legs coordination	Numbered circles test (seconds)	5.92	0.65	7.91	0.64	-1.99	7.567*
Balance	Stability balance	Standing with feet on bar (seconds)	30.56	2.15	23.53	2.64	7.03	7.152*
	Moving balance	walking on Swedish bench (seconds)	5.49	0.62	6.74	0.85	-1.25	4.112*
Accuracy		Shooting on	6.14	1.93	4.02	2.14	2.12	2.548*

	overlapped rectangles						
Locomotor test	Time sense error 10 seconds (second)	1.71	0.72	2.75	1.23	-1.04	2.53*
	Jump distance sense error 60 cm (cm)	3.36	0.95	6.93	1.78	-3.57	6.134*
	Compared visual sense error for walking distance 10m (cm)	37.68	1.58	43.23	2.17	-5.55	7.161*
	Compared visual sense error for walking direction 10m (cm)	23.23	2.31	31.73	2.86	-8.5	8.011*

* Significant at the 0.05 level = 2.074

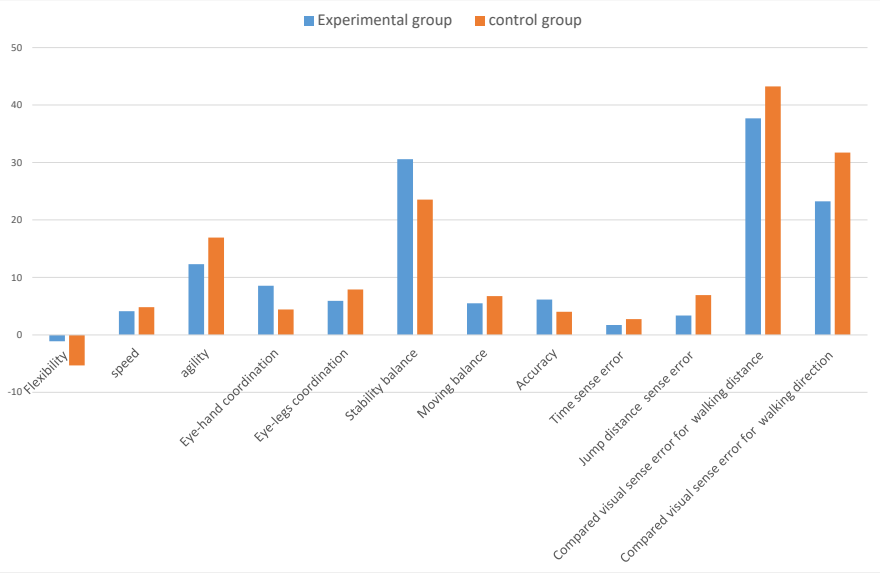

Figure (1) experimental and control groups means in locomotor and physical tests after experiment

Table (13) and figure (1) reveal significant differences between experimental and control groups post measurements in locomotor and physical tests as T value ranges between (2.421 and 12.67) values which is greater than T significant at 0.05 level.

Researcher attribute this improvement to the effectiveness of coordination exercises program, which applied to experimental group, with what it includes from varied and exciting gradually loaded exercises with and without tools, which led to improve

some physical abilities (flexibility, speed, agility, coordination, balance, and accuracy). This effect reflected in improving locomotor abilities, so first hypothesis is accepted (There are statistically significant differences between pre and post measurements of some locomotor and physical abilities within experimental group handicapped children in favor of post measurements.).

Coordination has reciprocal relationships with physical and motor elements; as agility, accuracy, balance, speed and muscle ability are of the most important components of motor coordination. (Abbas, 2005, p. 103 and Ibrahim, 2007, p,82)

This coincides with what referred by Musa (2009, p.108) and Moghazi (2010, p.130) that mentally disabled children practicing of physical activities and games lead to motor abilities development (flexibility, speed, agility, coordination and balance). It also improve their motor performance and motor skills cognition to qualify them to do everyday life skills and self-reliance in face of daily life problems.

Due to delayed motor development for mentally disabled children and what they face from dispersion and disorders, they are less capable of walking and running in right way, and they are behind at least two years from normal child. They reach their complete ability in muscle coordination, motor skills, body balance and locomotor cognition physical and perceptual only by organized physical education programs in home and at school. (Moghazi, 2010, p.120)

This is confirmed by Taha (2006, p.16), where he stressed on that physical training for handicapped children (mental disability) make progress in their motor performance and help them to learn mental cognitive skills. This because mentally disabled child delayed in sitting, standing, walking, jumping and running, so he needs to exercise for development of motor abilities in general and motor balance in particular.

Improvement in locomotor abilities is due to gradual education, using visual stimuli to help develop visual and motor sense, giving a model for proper performance of each movement and correct errors during performance, and regular training that improves the functions of motor analyzers. In addition, improving physical abilities lead to development of locomotor perception (Shaaban, 2012, p.88)

Control group progress in locomotor and physical abilities, even it is simple and non-remarkable, is due to the nature of school motor activity, as constancy in training, physical exercise and

motor activities lead to improve physical ability and locomotor perception. (Shaaban, 2012, p.14 and Gouda , 2014, p.102)

Table (14) Significance of differences between experimental and control groups in ADHD checklist after experiment

Statistical indicators / variables	Experimental group **(n=12)**		Control group **(n=12)**		Mean difference	T
	Mean	±SD	Mean	±SD		
Attention Deficit	37.19	3.76	46.36	5.12	-9.17	5.000*
Hyperactivity	35.67	3.35	48.86	4.75	-13.19	7.861*
Impulsivity	29.36	2.95	44.57	4.67	-15.21	9.536*
Total	102.22	7.68	139.79	8.42	-37.57	11.419*

* Significant at the 0.05 level = 2.074

Table (14) and figure (2) reveal significant differences between experimental and control groups post measurements in ADHD checklist as T value ranges between (5.000 and 11.419) values which is greater than T significant at 0.05 level.

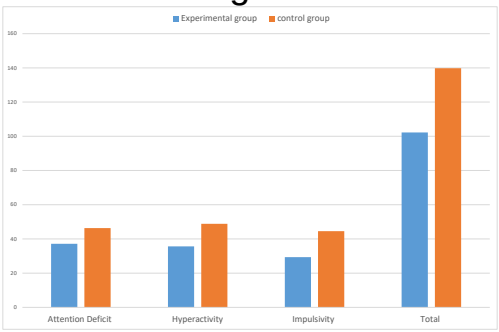

Figure (2) experimental and control groups means in ADHD checklist after experiment

Researcher attribute this improvement to the effectiveness of the proposed physical exercise program which was effective on easing ADHD in mentally disabled children, so second hypothesis is accepted (There are statistically significant differences between post measurements of some locomotor and physical abilities within experimental and control group handicapped children in favor of experimental group)

This confirmed Alsharif (2014) study results, which proofed that recreation programs using exercise with tools was effective in easing ADHD within learnable mentally disabled children.

Mentally disabled child participation in exercises and motor activities help him to achieve rehabilitative goals not only in physical and motor aspects, but also in psychological aspects, ease behavioral and social disorders, and the acquisition of

healthy behaviors and habits through social interaction among participants. (Kashef, 2002, p. 45; Ben Gawad & Hassan, 2005, p34; Abdulgawad, 2009, p.89; Ghorab, 2010, p. 32; Hassn, 2011, p.65; and Abdulaziz, 2013, p.67)

This is confirmed by study results of Abuzaid (2004), Morsi (2006), Briere, D. E., III, & Siegle (2008), and Alsharif (2014), which confirmed that public attitudes towards sports activities within handicapped children are more positive to achieve best level in easing behavioral disorders, and to get rid of negative and impulsive emotions.

Conclusions:

1- Using coordination exercises led to improve locomotor and physical abilities within handicapped children
2- Using coordination exercises led to ease ADHD within handicapped learnable children
3- Using coordination exercises is better than using motor activities normally used in handicapped children schools

Recommendations:

1- using ADHD observation checklist in establishments that care with learnable handicapped children.
2- Applying the coordination exercises program in these establishments with help of physical education graduates.
3- It is necessary for intellectual schools program planners to get interest with physical abilities development program and implement it
4- Provide assisting tools that used in physical education classes in intellectual education schools.
5- There is a need for further scientific studies of this age group.

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Appendix (1)

Physical tests

Physical abilities		Test	Measurement unit	Reference
Flexibility		Trunk front flexion from long sitting test	(cm)	(Hassanien, 2001, p, 65)
speed		20 m running	(second)	(Hassanien, 2001, p, 89)
agility		Zigzag running	(seconds)	(Hassanien, 2001, p, 357)
coordination	Eye-hand coordination	Ball throw and receive within 30 seconds	(number)	(Hassanien, 2001, p, 410)
	Eye-legs coordination	Numbered circles test	(seconds)	(Hassanien, 2001, p, 412)
Balance	Stability balance	Standing with feet on bar	(seconds)	(Hassanien, 2001, p, 434)
	Moving balance	walking on Swedish bench	(seconds)	(Hassanien, 2001, p, 429)
Accuracy		Shooting on overlapped rectangles	(number)	(Hassanien, 2001, p, 441)

Locomotor tests:

Test	Measurement unit	Reference
Time sense error 10 seconds	(seconds)	(Salama,

		2000, p, 168) (Shamoon, 2002, p, 214)
Jump distance sense error 60 cm)	(cm)	(Salama, 2000, p, 164) (Shamoon, 2002, p, 212)
Compared visual sense error for walking distance 10m	(cm)	(Salama, 2000, p, 165) (Shamoon, 2002, p, 215)
Compared visual sense error for walking direction 10m	(cm)	(Salama, 2000, p, 166) (Shamoon, 2002, p, 216)

Appendix (2)

ADHD checklist from DSM IV, amended by Alsharif (2014), it made up of three aspects containing (32) phrases on quintuple response scale (always happen, often happen, sometimes happen, rarely happen, never happen) with scores (5, 4, 3, 2, 1) respectively.

First aspect: Attention deficit: phrases 1, 4, 7, 10, 13, 16, 19, 22, 25, 28, 31.

Second aspect: Hyper activity: phrases 2, 5, 8, 11, 14, 17, 20, 23, 26, 29, 32

Third aspect: Impulsivity: phrases 3, 6, 9. 12, 15, 18, 21, 24, 27, 30.

No	Phrases	Always happen	Often happen	Sometimes happen	Rarely happen	Never happen
1	Easily Distracted					
2	fails to give close attention to details					
3	makes careless mistakes in schoolwork					
4	has difficulty sustaining attention in tasks or activities					
5	Bored by performance one activity after few minutes and move from one activity to another					
6	fails to finish school work and things he started					
7	loses things necessary					

	for tasks or activities (e.g., toys, school assignments ,pencils, books, or tools)					
8	does not seem to listen when spoken to directly					
9	Easily confused and slowly move					
10	is often easily distracted by extraneous stimuli					
11	often avoids, to engage in tasks that require sustained mental effort					
12	often ‘on the go’ or often acts as if ‘driven by a motor’					
13	fidgets with hands or feet or squirms in seat					
14	leaves seat without need					
15	has difficulty playing quietly					

16	Turning too much around me without cause					
17	runs about or climbs excessively in situations in which it is inappropriate					
18	talks excessively without benefit					
19	Change direction while walking without justification					
20	lot of tampering with the tools in front of him					
21	Moving from one place to another in an annoying manner					
22	Make chaos in the place he is in					
23	blurts out answers before questions have been completed					
24	mostly cannot wait					

	for turn					
25	suddenly speaks loudly without taking system into account					
26	interrupt other people when they’re talking					
27	Defies and refuses what others order him					
28	Issue impressions of places and tools before examination					
29	blames others in spite of his misconduct					
30	Has difficult to make friendships with others					
31	rushes in his reaction while assigned any work					
32	Get anger unexpectedly					

ADHD checklist validity

Internal consistency coefficient between aspects and over all list ranged between (0.941 and 0.989), the matter confirms aspects validity, Internal consistency coefficient between aspects ranged between (0.869 and 0.973), the matter confirms that aspects are

significantly correlated, and measure what checklist measure and characterized with self validity.

ADHD Reliability:

Alpha Cronbach reliability coefficient for checklist phrases ranged between (0.675 and 0.746) and for the list was (0.881), the matter that confirm aspects homogeneity; and that it characterized with reliability. Test/retest reliability coefficient ranged between (0.904 and 0.996) the matter which confirms variables reliability.