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Research Paper

Effect of using combined approach of perceptual motor training and sensory integration therapy children with autisms

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Abstract: this study was undertaken to investigate the effectiveness of combined approach of sensory integration therapy and perceptual motor therapy.10 children with autism were selected according to randomly and then allotted into 2 groups (experimental and control) 5 in each randomly. Result indentified changes in BERRY VMI scaling scores for both groups. Combined approach of SI and PMT given to experiment group while Sensory integration only therapy given to control group. Subject of both the groups were given intervention for 2 month 5 days in a week and 1 hour per session. The subject of group, experimental group undergone combined approach including perceptual motor training 15 minutes and 1 hour of sensory intervention and group , control group subject were 1 hour of sensory integration intervention. Post test score of both the groups were analyzed by same BERRY VMI for result. Overall improvement of children occurs in both the groups. However ,the experiment group had show better improvement as compared to control. From the above experiment it has been concluded that combined approach of sensory integration and perceptual motor is more effective then sensory integration therapy alone. Thus perceptual motor therapy can be incorporated in the usual practice to get better improvement in autism.

Autism has become prevalent problem in our society and to overcome its features more and more intervention programs are into evidence to improve the quality of life of children with autism have accumulate.

Autism spectrum disorder is a heterogeneous neurodevelopment disorder of multifactorial origin, characterized by deficits in social interaction and communication. [6]

Sensory processing disorder is quite common among children with ASD. Sensory processing disorder is impairment in detecting, modulating interpreting or responding to sensory stimuli. sensory modulating disorder are impairment in regulating in degree, intensity and nature of response to sensory input, resulting in considerable problems with daily roles and routine, three subtypes of sensory modulating disorder; sensory overresponsivity, sensory underresponsivity and sensory seeking [49]

In the children with austism, most of them have problem in carrying out gross motor skills, sapital, time, physical and navigation perception and other motor skill. These problem leads to children act stumble in doing things, be weak physically and have poor motor control to any disruption in the process of moving affects perception system and as a result of learning. Undoubtedly, the relationship between perception and movement is important. Without perception, even the simplest move if not possible, difficult in children who have severed autsim Exponents of Perceptual-motor method believe that motor learning is the learning origin and higher mental processes arises after proper development of motor system and perceptual system and also communication links between motor learning and perceptual .

The term perceptual-motor interpretation, refers to interpretation and individual response to a stimulus[9] The perceptual motor reactions are the motor responses resulting from the analysis of perceptual motor actions in brain, the term perceptual motor implies the interpretation and the changes in the individual response to a stimulus.[4]

Motor skills one of the basic skills and basis for school and academic learning. Mental – motor skills is all-dimensional and complex set of developmental abilities in children that integrated and organized in two main aspects (perception and movement) [9]

Sensory integration is the neurological process that organizes sensation from one's body and from the environment and makes it possible to use the body effectively in the enviorment

Sensory- based therapies are progressively more used by therapists in the management of children with developmental and behavioural disorders. These therapies engage activities that are thought to manage the sensory system by providing vestibular, proprioceptive, auditory, and tactile inputs.[1]

Proprioception is defined as a cornerstone in sensory integration therapy. Muscle movements against resistance or gravity, traction, compression, movements related with muscles and joints provide proprioceptive stimulus and are used to improve motor coordination, to increase body awareness and to help arousal level modulation .

Perceptual- motor training programs, are valid physical education programs which are regulated based on the level of maturity, and have many of the same elements. The purpose of these programs, are increasing academic achievement Perceptual- motor activities play an important role in the development of the child's motor abilities.[2]

Perceptual -motor exercise comprise a combination of exercise with corporal cognizance, distinctiveness, flexibility, match of perceptual-motor, cognition and eyesight control.[4]

So purpose of this study is to find effectiveness on using combined approach of sensory integration therapy and perceptual motor training on children with autism. Specifically the role of combined therapy to improve motor perception is not available in most of the studies so in this study to objective is to explore the outcome which can be analysed by using combined therapy as an occupational therapy apporach in children with autism

I. Methods

Sample size & sampling methods:

The method of this research is quasi-experimental studies and in which is used the pretest and posttest design with control group. The study population are all autistic children in santosh college of occupational therapy

In this study, randomized control trail method is used. This means that among autistic children, 10 children were selected and randomly divided into two experimental groups (n = 5) and control groups (n = 5) All the children were assess by using BEERY VMI to establish the baseline data as pre-score data. Children in one group (experimental group) were given combined approach of perceptual motor training and sensory integration therapy and children in the other group (control group) were given only conventional sensory integration therapy.

The subject of both the group were given intervention for 45 days, 6 weeks days a week and 1 hour per session. The subject of group 1- experimental group had undergone combined approach including perceptual motor training for 15 minutes and 1 hour of SI intervention and group 2nd subject were given 1 hour of SI intervention. In order to collect information from BEERY VMI tests were used. To analyze the data used SPSS 23 software and in order to analyze the data was used from two independent t test formula and analysis of covariance. the selected perceptual motor training program on experimental group, was doing its own usual activities in hospital.The specially designed programme of perceptual motor training was divided into 3 phases so that training will be interesting as well as providing challenge and opportunity to learn and improve their skills.

Table 1

S.NO	Activity	Focus
1.	kicking the ball on the ground walking	motor coordination
2.	imitation of animals	Proprioception
3.	walking on straight line and standing on one foot	motor coordination
4.	throwing ball into basket	motor coordination
5.	passing through obstacles in from zigzag	proprioception and motor coordination
6.	guessing figure with closed eyes	visual development
7.	with eyes closed , touch tip of the nose	visual motor

Phase I

Activity for 15 days

Table 2

Phase II
Activity for 15 days

S.NO	Activity	Focus
1.	connecting index fingers to each other	motor coordination
2.	naming body limbs	orientation
3.	holding paper with non-premier hand cutting with premier hand	visual development
4.	puzzles completion of human body	
5.	jumping with both feet over small obstacle	proprioception
6.	chasing the pending ball with eyes	visual motor
7.	standing on balance board	motor coordination

Table 3

Phase III
Activity for 15 days

S.NO	Activity	Focus
1.	Bouncing on better foot in square	joint proprioception
2.	while jumping hit a pair of balls forward ground	proprioception
3.	Throwing the ring into the distinctive area	visual motor coordination
4.	Imitation of coach's feet movement	motor coordination
5.	Throwing the ball to the distinctive spots on the ball	coordination of arms and torso, fine motor control, and the ability to "read" distances
6.	Bubbling up and chasing up it	gross motor skill and eye hand coordination
7.	Turing ball inside the jar in direction of coach's finger	visual coordination

Data analysis:

To describe the data descriptive indicators such as central tendency [mean] and dispersion [standard deviation] were used. Tables and graphs were plotted with the help of EXCEL software. After ensuring normal data using Kolmogrov-Smirnov [K-S], the t correlated test was used to investigate the within group changes from pre-test to post-test also to compare the means of the control and experimental groups to determine the effect of exercise intervention, independent t test was used. The analysis was performed using SPSS software version 23.in all cases the significant level was considered 0.05.

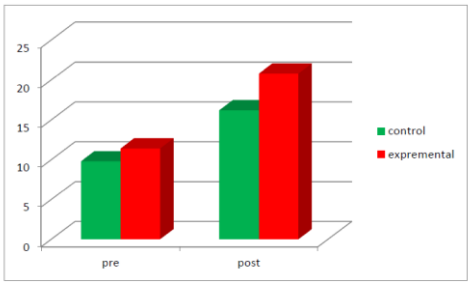
Paired t- test

Variables	Experimental	Control	P value	
			control	Experimental
VMI raw score Pre Post	Mean ± SD 16.20 3.03 20.80 2.775	Mean ± SD 9.80 2.168 11.40 2.702	0.011	0.057
VMI standard score Pre Post	76.20±16.784 95.80 ±9.706	78.60±23.480 85.60±26.36	0.001	0.001
NCE Pre Post	17.80± 22.61 44.20± 13.60	14.00± 17.635 33.40± 31.87	0.184	0.001
t-score Pre Post	34.20± 11.454 47.00± 6.595	29.00± 28.974 32.80± 31.878	0.000	0.001
Scaled score Pre Post	5.40± 3.286 9.00± 1.871	5.60± 4.669 13.00± 12.410	0.836	0.004
Percentiles score Pre Post	14.60± 26.025 39.20± 23.563	22.00± 26.005 35.22± 36.295	0.009	0.007

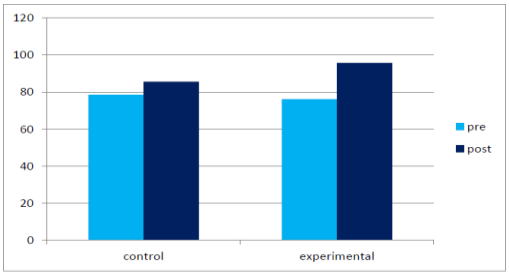
		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	do	Sig. (2-tailed)
VMI raw score pre	Equal variances assumed	.111	.748	-3.838	8	.005
	Equal variances not assumed			-3.838	7.241	.006
Post	Equal variances assumed	.039	.849	-5.427	8	.001
	Equal variances not assumed			-5.427	7.994	.001
VMI standard score	Equal variances assumed	1.022	.342	.186	8	.857
	Equal variances not assumed			.186	7.241	.858
Post	Equal variances assumed	7.714	.024	-.812	8	.440
	Equal variances not assumed			-.812	5.064	.453
NCE pre	Equal variances assumed	.001	.982	-.296	8	.775
	Equal variances not assumed			-.296	7.551	.775

post	Equal variances assumed	6.401	.035	-.697	8	.506
	Equal variances not assumed			-.697	5.412	.515
t-score pre	Equal variances assumed	2.111	.184	-.373	8	.719
	Equal variances not assumed			-.373	5.220	.724
post	Equal variances assumed	5.198	.052	-.975	8	.358
	Equal variances not assumed			-.975	4.342	.381
scaled score pre	Equal variances assumed	1.103	.324	.078	8	.939
	Equal variances not assumed			.078	7.182	.940
post	Equal variances assumed	3.054	.119	.713	8	.496
	Equal variances not assumed			.713	4.182	.514
percentile pre	Equal variances assumed	.012	.915	.450	8	.665
	Equal variances not assumed			.450	8.000	.665
post	Equal variances assumed	1.710	.227	-.206	8	.842
	Equal variances not assumed			-.206	6.863	.843

VMI RAW SCORE

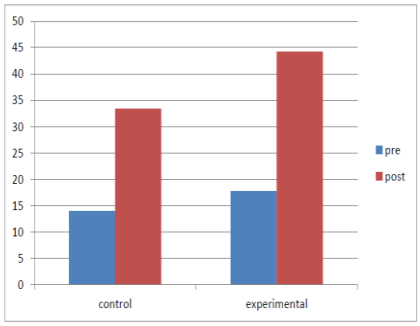


Graph no.1 VMI RAW SCORE

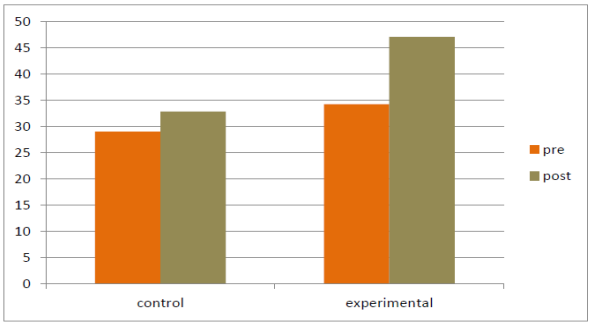


Graph no.2 Standard Score t- score

NCE SCORE



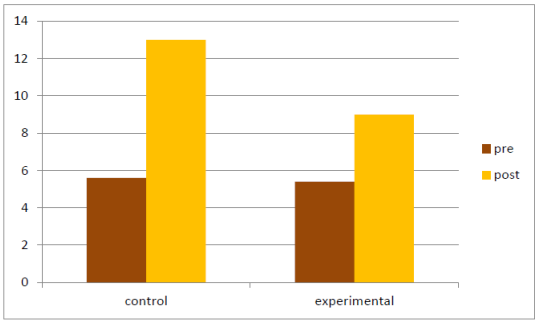
Graph no. 3 NCE Score



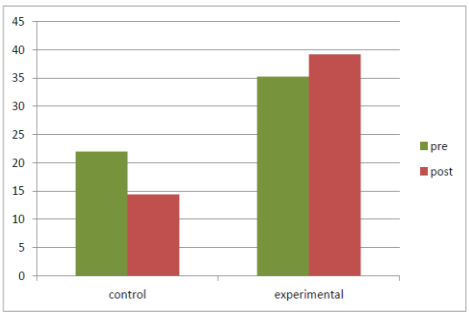
Graph no.4 t- score

Scaled score

percentile score



Graph no.5 scaled score



Graph no.6percentile score

In order to evaluate the effects of the combined approach of the sensory integration therapy and perceptual motor training to improve perceptual motor skills, the Beery VMI test were performed pre-intervention and post intervention on both experimental and control group.

To compare the scores of subjects of the two groups the t independent test and to investigate the effect of sensory integration therapy and perceptual motor training of autism in control and experimental group's correlated t-test was used. Paired (t-test) samples test were conducted to obtain mean differences with in the groups (control and experimental) and independent samples test were conducted to obtain mean difference between each variables and group.

A significant difference was found when comparing the mean of visual- motor integration raw score in control group mean (pre=9.80, SD= 2.168 ; post=11.40, SD=2.702) and means difference of experimental group mean(pre=16.20,SD=3.033: post 20.80, SD= 2.775), visual motor integration standard score mean control group (pre=78.60 SD=23.480; post 85.60 SD=26.369) ,and experimental group mean (pre=76.20 SD= 16.784, post 95.80,SD=9.706), visual motor integration NEC score in control group mean (pre=14.00 SD=17.365,post 33.40, SD=31.827) and experimental group mean (pre=17.80, SD=22.621, post 44.20, SD=13.609), visual motor integration t-score control group (pre=29.00, SD=28.974, post 32.80,31.878) and experimental group mean (pre mean =34.20,SD=11.545; post mean= 47.00,SD=6.595) , visual motor integration scaled score mean control group (pre =5.60,SD=4.669, post =13.00, SD=12.410), and experimental group mean (pre=5.40, SD=3.826, post =9.00,SD=1.871), visual motor integration percentile mean control group (pre=22.00, SD=26.005, post =35.22, SD=36.295), means of experimental group (pre 14.60 SD=26.025, post =39.20,SD=23.563).

II. Discussion

Findings of current research showed significant difference between experimental group and control group in developing motor skills. In relation to subscale of perceptual motor skill in children with autism it means that there is a significant difference between control group and experimental group mean. Since children with autism face low spasm, this leads to slower development and low performance for them in main steps of development such as gross motor skill and proprioception activity

Gomez-Pinilla Fet al. (2011) The fact that perceptual-motor training plays an important role in the plasticity of the nervous system, has been proved well However, most researches conducted on ordinary people, or people with other disorders.

Norton DJ, et al (2011) In fact, perceptual-motor training through facilitate neural plasticity, creating new synaptic structures, decline of cognitive disorders Ellemberg D, St-Louis-Deschenes M, (2010), increasing visual perception by increasing visual signal productivity , improving cognitive and neurological health, increasing the performance of data processing , Afshari J (2012) increasing the efficiency of neurotransmitters, neural adaptations, behavior and emotion regulation performance recovery

Ellemberg D, St-Louis-Deschenes M 2010 can improve productivity of neurophysiological, development of the brain and motor development and enhance nervous system function and cognitive performance Reinvall et al. (2013) found deficits in ASD in Visuomotor Precision and Design Copying on the Finnish version of the NEPSY-II with similar findings by Mayes and Calhoun in their 2003 and 2007 studies using the DTVMI. As shown in the present study, VMI performance was attenuated at the group level. However, more than three-fourths of the ASD participants in the current ASD cohort did not exhibit VMI performance deficits (i.e., performance within 1.5 S.D. of the normative sample) with Mince and colleagues' (1997) observations in their ASD sample People with autism have reported (Shoener, Kinnealey, & Koenig, 2008) that selfstimulatorybehaviors often serve as a regulatory function, allowing them to process sensoryinformation from the world around them and attend without the alternative, which is sensoryoverload. The reduction of autistic mannerisms or self-regulatory behaviors may beindicative of a better ability to process

sensory stimuli in the environment without the needfor regulatory strategies. Although essential for some people on the autistic spectrum,autistic mannerisms are often perceived as socially inappropriate by neurotypical people.This perception can contribute not only to barriers of communication but also to acceptancein mainstream society. In addition, the ability to self-regulate is essential for quality of life.which are consistent

The results of this study may be explained due to the action of Gibson's perception-action theory. According to this theory there is close internal relationship between perceptual system and motor system. The implied refers of these comments in motor development is that these capabilities do not change with a change in the person and lead to new movement patterns. Development size or increase motor abilities may provide the ability to do things which previously were not possible.

Ahmadi (1389) in a research examined the effect of perceptual motor exercises on motor skills and mathematical in Autism and review mono subject .The results showed that perceptual motor exercises well motor skills improve children with autism .However , their impact on math skills were not obvious .

(Booth et al., 2003) and writing (Hellinckx et al., 2013) elements. The ability to appropriately space Words may relate to difficulty in movement planning; bias to local versus global processing is considered a key feature of autism (Booth et al., 2003). Studies by Fabbri-Destro et al. (2009) revealed that when chaining multiple upper limb motor actions into a global actions, children with autism perform more slowly and perform the whole movement as series of independent steps, with little planning of subsequent movements in preparation for global movement endpoint (Fabbri-Destro, Cattano, Boria, & Rizzolatti, 2009). During handwriting, TD children make motor preparations for an entire syllable of a word in advance; the movement required for the first syllable of a word is prepared before starting to write, and preparation for the second syllable occurs during production of the first (Kandel, Soler, Valdois, & Gros, 2006). Reduced spacing between words in the HFA group therefore may relate to planning each letter individually, rather than preparation of syllables, words and sentences as a whole, With a lack of anticipation of each movement endpoint. Another contributing factor to slow Handwriting speed may also be increased motor noise, i.e. inefficient motor movements while writing (Johnson et al., 2013)

Afshari [2012] in his study to investigate the effect of exercise on cognitive-motor attention of children with autism spectrum disorders, and came to the conclusion that perceptual-motor training increased cognitive neurological function and improved attention in children with autistic spectrum

III. Conclusion

In summary the finding of the current study suggested that VMI performance. In ASD group has show significant improvement in experimental group compare to control group. This current study also conclude that VMI found that ASD is not associated with oval all level of autism symptom severity. It has been concluded in various study that SI therapy is effective in the treatment of autism children as it help children to become more independent to participate in ADL but there are not many study which find out the effectiveness of SI therapy along with perceptual motor training on ASD population so in the study we can conclude that perceptual motor training along with occupational therapy intervention is beneficial to ASD population which has shown improvement in bilateral motor coordination .which they were lacking before students have also improve their griping strength and hand writing skill as reported by special education and parents. Although know standardized scale has been taken as an outcome measured to evaluated hand writing and coordination skill. It can conclude if this training programme can be done for longer duration can show more transfer effect on functional task. Combined approached of sensory integration therapy and perceptual motor training with autism in a variety of life roles and tasks if it is incorporated into that individual's life in appropriate way. Using effective strategies and technics in occupational therapy intervention program provide opportunities to develop wide range of skills in individuals with autism

LIMITATION OF THE STUDYi) Sample size was small, thus it is difficult to generalize the findings. Ii) Population sample was confined to autistic children iii)Study duration was short Children has no alternate choice of environment

FUTURE

is) Large sample size with homogenous group can be takenii) Additional studies of long term benefits can be carried out iii)this type of study can be implemented to other functional disabilities

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