International Journal of Movement Education and Sports Sciences (IJMESS)
Annual Refereed & Peer Reviewed Journal Vol. III No. 1 January-December 2015
Online ISSN 2321-7200 Print ISSN 2348-5604

Changes in Psycho-Motor abilities Combining Choice of Reaction Time and Inter-limb Coordination through Yogic Practices

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(Received 21 September 2015 – Accepted & Published 30 October 2015)

Abstract

Background: To find out the effect of 12 weeks yogic practices on selected psycho-motor abilities combining choice reaction time and inter-limb Coordination.

Methods: For achieving the purpose 30 school going children were selected and their age ranged from 11 to 16 years. The necessary data on the selected psycho motor abilities like reaction time observed through hand and leg reaction time chronoscope and inter limb Coordination observed through different Potential Bimanual Test and assessed by 3 judges /expert according to the students task performance. In this study 12 week yogic training were given to selected students on three days only. The data were collected from prior and after experimentation on selected variable. Descriptive statistics and paired t test statistical techniques were used for data interpretation. Level of significance set at 0.05.

Results & Discussion: The result of the study suggests that there are insignificant differences found in selected psycho motor abilities like right hand reaction time, left hand reaction time, right leg reaction time. However, the significant differences are occurred due to the 12 weeks yogic training only in left leg reaction time and inter-limb coordination, these changes occurred probably due to the high level of rhythm city and synchrony between the hands and feet. Research suggests that reaction time and inter-limb coordination has a link with skills ranging from daily life skills to complex movement behaviours. Some children have problems with their reaction and inter-limb coordination. The different activities described by the physical education teacher on the field and class as well, on that occasion the teachers identify the children with coordination problems. With coping these problems physical education teachers design a movement program that addresses the improvement in reaction time and inter-limb coordination for all children as well. In fact, we believe that a regularly implemented comprehensive movement program like yogic practice and regular physical education classes can be instrumental in preventing the problems with reaction time and inter-limb coordination. Research scholar strongly suggest that all teachers of young children make activities that emphasize inter-limb coordination part of their comprehensive movement programs for the children that include other Psycho motor skills categories and general physical fitness.

Conclusion: The study reveals that the, 12 weeks yogic practice has significantly improved the left leg reaction time and inter-limb coordination. On the other hand 12 weeks yogic training has not sufficient to improved right hand reaction time, left hand reaction time, right leg reaction time.

Keywords: Psycho Motor Ability, Reaction Time, Coordination

INTRODUCTION

Researchers and educators are well aware of the importance of promoting motor skill function in young children. In fact, early childhood is generally considered to be a period of landmark significance for motor development. Elements of "motor behavior that develop and emerge during this period provide a substantial part of the motor skill foundation upon which more complex motor programs are formed" (Gabbard, 2008, p. 280). Several studies also suggest that early motor behavior plays an important role in social, emotional, and later academic related activities (Wijnroks & van Veldhoven, 2003; Burns, O'Callaghan, McDonell, & Rogers, 2004; Murray, Veijola, Moilanen, Miettunen, Glahn, Cannon, Jones, & Isohani, 2006; Piek, Dawson, Smith, & Gasson, 2008). In addition to aiding professional evaluations of overall physical well-being, assessment is important for early detection of children with a high risk for developmental disorders. Early detection enables practitioners to provide intervention at a young age, when plasticity of the nervous system is high. Early motor behavior plays an important role in a variety of life activities. For example, level of fine- and visual-motor ability is associated with daily-living skills (Jasmin, Couture, McKinley, Reid, Fombonne, & Gisel, 2009), movement proficiency (Astill, 2007; Wilson & McKenzie, 1998), and cognitive ability (Bumin & Kavak, 2008; Goyen & Lui, 2002; Piek et al., 2008; Wuang, Wang, Huang, & Su, 2008). Furthermore, recent research also indicates correlations between gross-motor skill and school (academic) performance (Astill, 2007; Gibbs, Appleton, & Appleton, 2007; Piek et al., 2008). Diamond (2000) suggests that both motor and cognitive performance share a common brain structure. Piek et al. (2008) noted that children who have better gross motor skills may be able to process information better and faster, which helps cognitive performance. In summary, there are several indications that early movement experiences are an essential agent for developmental change in children, including cognitive development (Campos, Anderson, Barbu-Roth, Hubbard, Hertenstein, & Witherington, 2000). The general classifications of motor categories typically described (fine motor, visual motor, and gross motor), an aspect of motor function that has gained the attention of researchers in recent years is interlimb coordination. There are indications that this aspect of motor behavior differentiates academic performance in some populations of young children (Bobbio, Gabbard, Gonçalves, Barros Filho, & Morcillo, in press). Our intent with this article is to (1) describe interlimb coordination and its development, (2) provide examples of test items and activities, and (3) give recommendations for early childhood educators who work with young children. These movements involve skilled interlimb coordination of the two arms in a bimanual action. Bimanual movements require intralimb coordination, as well as integration and sequencing of actions between limbs (i.e., interlimb coordination). Bimanual coordination represents a complex self-organizing system that is subject to both internal (biopsychological) and contextual (task) constraints. It has been suggested that development of interhemispheric transfer (Cardoso de Oliveira, 2002; Fagard, Hardy-Léger, Kervella, & Marks, 2001) and the corpus callosum play an important role in this process (Kennerley, Diedrichsen, Hazeltine, Semjen, & Ivry, 2002; Muetzel, Collins, Mueller, Schiessel, Lim, & Luciana, 2008). The corpus callosum is a structure of the brain in the longitudinal fissure that connects the left and right sides of the brain. Its main function is to facilitate communication between the two hemispheres—a process that is essential to interlimb coordination. Brakke, Fragaszy, Simpson, Hoy, and Cummins-Sebree (2007), who studied infants, note that bimanual coordination is clearly important to adaptive human functioning, yet our understanding of its development during childhood is incomplete. Although several types of bimanual actions can be

observed in an individual's repertoire, most research task items have focused on the patterns of coordination that appear in cyclic movements: for example, continuous finger tapping with index fingers of both hands, finger tapping with one hand while tracing a circle with the other hand, or circle drawing with both hands. Studies using such tasks indicate that there is evidence for interlimb control between the two hands beginning around age 4. Overall, several significant developmental changes occur between the ages of 4 and 10 years (e.g., Fagard et al., 2001; Otte & van Mier, 2006; Pellegrini, Andrade, & Teixeira, 2004; Robertson, Bacher, & Huntington, 2001). According to Brakke and colleagues (2007), children are more variable in timing many of their bimanual movements than are adults. For example, response times from one sequence or cycle of action to the next may not be stable. In that study, children were asked to draw two circles with both hands at the same time. The children were not as fast and as stable as the adults performing the same task; in other words, one of the child's hands would lead the other during the task. Children also tend to move at a slower pace when performing repetitive actions, such as finger tapping or circle drawing, compared with adults (Fagard et al., 2001).

Objectives

To find out the effect of 12 weeks yogic practices on selected psycho-motor abilities combining choice reaction time and interilimb Coordination.

METHODOLOGY

For achieving the purpose 30 school going children were selected from the Chhattisgarh government school and their age ranged from 11 to 16 years. The necessary data on the selected psycho motor abilities like reaction time observed through hand and leg reaction time chronoscope and inter limb Coordination observed through different Potential Bimanual Test and assessed by 3 judges /expert according to the students task performance. Interlimb coordination primarily involves movements requiring sequential and simultaneous use of both sides of the body with a high degree of "rhythmicity." More precisely, it involves the timing of motor cycles of the limbs in relation to one another (Swinnen & Carson, 2002). Such actions are like; i. Clap hands in time to a metronome (10 sec.), ii. Rhythmic flexion-extension movements of index fingers (10 sec.), iii. Draw circles with both hands simultaneously (10 sec.), iv. Reciprocal finger tapping with both hands (10 sec.), v. Catching ball with two hands (5 trials), vi. Tapping with one finger while tracing a circle or square with the other hand (30 sec.), vii. Alternating opening and closing hands (10 sec.), viii. With palms facing out and arms extended, move hands forward and back simultaneously (10 sec.), viii. Pivoting thumb and index finger touch the tip of the right index finger to the tip of left thumb & then pivot the hands to touch the tip of the left index finger to the tip of the right thumb (10 sec.). In this study 12 week yogic training were given to selected students on three days Monday, Wednesday and Friday only. The data were collected from prior and after experimentation on selected variable. Descriptive statistics and paired t test statistical techniques were used for data interpretation. Level of significance set at 0.05.

RESULTS

Table 1: Descriptive Statistics of Right Hand Reaction Time

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre RHRT	.167317	30	.0293334	.0053555

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre RHRT	.167317	30	.0293334	.0053555
	Post RHRT	.165257	30	.0203011	.0037065

The above table shows paired sample statistics of pre and post right hand reaction time response for school going children.

Table 2: Significant Difference of between Pre and Post Right Hand Reaction Time

Paired sample t test					
Variables	groups	N	't'	df	Sig. (2-tailed)
Right Hand Reaction Time	Pre	30	0.386	29	0.703
	Post	30			

The value of two tail significant is more than 0.05 (p>0.05), as such difference between means is insignificant. The output indicates that there is insignificant difference in pre and post left leg reaction time. The right hand reaction time with post test is much better than the pre test.

Table 3: Descriptive Statistics of Left Hand Reaction Time

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre LHRT	.171607	30	.0286108	.0052236
	Post LHRT	.170973	30	.0236767	.0043228

The above table shows paired sample statistics of pre and post left hand reaction time response for school going children.

Table 4: Significant Difference of between Pre and Post Left Hand Reaction Time

Paired sample t test					
Variables	groups	N	't'	df	Sig. (2-tailed)
Left Hand Reaction Time	Pre	30	0.114	29	.910
	Post	30			

The value of two tail significant is more than 0.05 (p>0.05), as such difference between means is insignificant. The output indicates that there is insignificant difference in pre and post left leg reaction time. The left hand reaction time with post test is much better than the pre test.

Table 5: Descriptive Statistics of Right Leg Reaction Time

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre RLRT	.344980	30	.0636092	.0116134
	Post RLRT	.332220	30	.0320724	.0058556

The above table shows paired sample statistics of pre and post right leg reaction time response for school going children.

Table 6: Significant Difference of between pre and Post Right leg Reaction time

Paired sample t test

Variables	groups	N	't'	df	Sig. (2-tailed)
Right Leg Reaction Time	Pre	30	0.961	29	0.344
	Post	30			

The value of two tail significant is more than 0.05 (p>0.05), as such difference between means is insignificant. The output indicates that there is insignificant difference in pre and post left leg reaction time. The right leg reaction time with post test is much better than the pre test.

Table 7: Descriptive Statistics of Left Leg Reaction Time

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre LLRT	.382287	30	.0384173	.0070140
	Post LLRT	.344003	30	.0371623	.0067849

The above table shows paired sample statistics of pre and post left leg reaction time response for school going children.

Table 8: Significant Difference of between Pre and Post Left leg Reaction Time

Paired sample t test					
Variables	groups	N	't'	df	Sig. (2-tailed)
Left Leg Reaction Time	Pre	30	4.548	29	.000
	Post	30			

The value of two tail significant is less than 0.05 (p<0.05), as such difference between means is significant. The output indicates that there is significant difference in pre and post left leg reaction time. The left leg reaction time with post test is much better than the pre test.

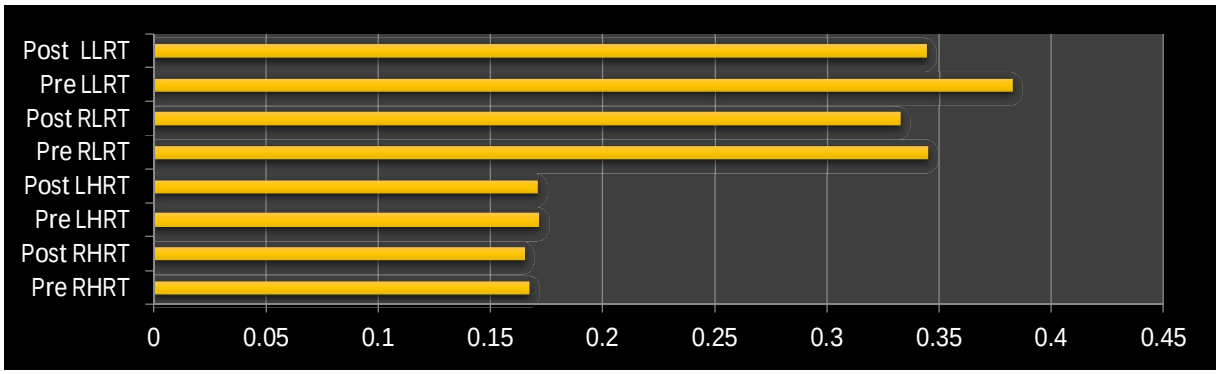

Fig1. Graphical Representation of pre and post Reaction Time

Table 9: Descriptive Statistics of Inter-limb Coordination

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre Inter-limb coordination	51.833333	30	9.1428636	1.6692509
	Post Inter-limb coordination	65.500000	30	8.6453097	1.5784104

The above table shows paired sample statistics of pre and post Inter-limb coordination response for school going children.

Table 10: Significant Difference of between Inter-limb Coordination

Paired sample t test					
Variables	groups	N	't'	df	Sig. (2-tailed)
Inter-limb coordination	Pre	30	-5.487	29	.000
	Post	30			

The value of two tail significant is more than 0.05 ($p>0.05$), as such difference between means is significant. The output indicates that there is significant difference in pre and post left leg reaction time. The inter-limb coordination with post test is much better than the pre test.

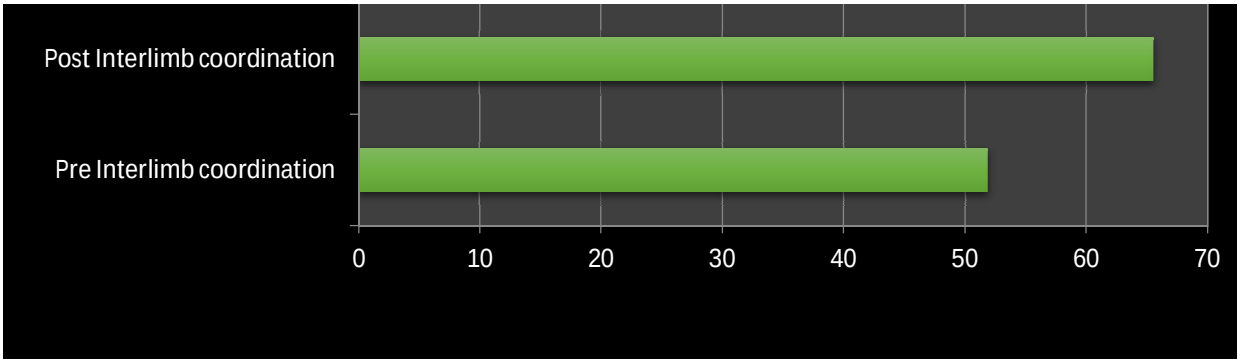

Fig2. Graphical Representation of pre and post Reaction Time

Discussion

The result of the study suggests that there are insignificant differences found in selected psycho motor abilities like right hand reaction time, left hand reaction time, and right leg reaction time. However, the significant differences are occurred due to the 12 weeks yogic training only in left leg reaction time and inter-limb coordination, these changes occurred probably due to the high level of rhythmicity and synchrony between the hands and feet. Research suggests that reaction time and interlimb coordination has a link with skills ranging from daily life skills to complex movement behaviours. Some children have problems with their reaction and inter-limb coordination. The different activities described by the physical education teacher on the field and class as well, on that occasion the teachers identify the children with coordination problems. With coping these problems physical education teachers design a movement program that addresses the improvement in reaction time and inter-limb coordination for all children as well. In fact, we believe that a regularly implemented comprehensive movement program like yogic practice and regular physical education classes can be instrumental in preventing the problems with reaction time and inter-limb coordination. Research scholar strongly suggest that all teachers of young children make activities that emphasize interlimb coordination part of their comprehensive movement programs for the children that include other Psycho motor skills categories and general physical fitness.

CONCLUSION

The study reveals that the, 12 weeks yogic practice has significantly improved the left leg reaction time and interlimb coordination. On the other hand 12 weeks yogic training has not sufficient to improved right hand reaction time, left hand reaction time and right leg reaction time.

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