

The SMART Program in an Urban Elementary School: An Action Research Project

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Introduction

Knox County Schools has recently adopted a program called the S.M.A.R.T. program: Stimulating Maturity for Accelerated Readiness Training. This program was originally developed in Minnesota, but is also being used by a school system in Georgia.

Knox County sent some physical education instructors and central office personnel to Georgia to observe the program in use there and talk with those who use the program. The result has been a “full buy in” from many of those in central office. Initially, they began SMART in a few elementary schools as a pilot program. After determining that SMART was beneficial to the children in those schools, Knox County began the process of training every kindergarten, preschool and physical education teacher in the county.

The premise of SMART is that there are developmental stages that children go through as they grow. Children who skip these stages (or go through abbreviated forms of them) do not develop the physical skills necessary for their later academic achievement. For example, a child whose eye-hand coordination is not developed appropriately will have difficulty when learning how to write. Other children do not outgrow certain reflexes and therefore continue to have those reflexes “fire off” in their brains throughout the day, which disrupts their thinking. Others do not develop the cross lateral coordination of their brains which is required for reading. By putting these children, specifically kindergarteners, through certain activities in order to stimulate their brains in a certain way, they will develop the skills they need to succeed academically.

Knox County believes that this program has helped increase test scores for the children who have participated in the program. I want to verify this with research of my own. Although we have implemented SMART at Sarah Moore Greene for two full years, we have never done any testing to determine the exact benefits to our children.

Researching these benefits would allow me to better inform parents of the development of their children. I would also be able to confidently encourage other teachers to use SMART on a regular basis. SMART is now mandatory for kindergarten, but may also help older children. We might even be able to “diagnose” a given developmental delay

and “prescribe” certain physical activities that will assist that development. Therefore, my research question is: Will implementing the SMART program with two kindergarten classes at Sarah Moore Greene result in improved academic performance and improved motor development?

Review of Literature

Introduction

The benefits of exercise and movement are well known. Evidence shows that participating in regular exercise can actually increase one’s life span and quality of life, make for a healthier, leaner body, and increase one’s energy (Summerford, 2001). But what can it do for the brain? According to Lindsey (1998-99), about 50% of infants and toddlers begin life burdened with obstacles and without the support necessary to succeed academically. Also, one in three kindergarten students does not have the fundamental skills necessary for learning. A program such as SMART might be able to “even the playing field” for these children. The purpose of this research is to determine the effectiveness of the SMART program with urban kindergarten students in Knoxville, TN. In order to support that effort, this literature review will answer the following questions: How does the brain develop and what is its basic structure? What are the benefits of movement related to cognition? What is the SMART program and what has been its effectiveness with other children?

The Brain: Basic Structure and Development

According to Templeton and Jensen (1996), the brain is composed of four parts: the cortex, which controls thinking and learning; the upper and lower brain stem; and the cerebellum. Summerford (2001) tells us that the cerebellum is completely responsible for muscle movement, but is also vital in coordinating thought. The brain has two

hemispheres, or halves, each of which has four lobes (frontal, parietal, temporal, and occipital). This produces three midlines across which the brain must communicate: the sagittal (right side to left side), transverse (upper and lower), and frontal (front to back) (Corso, 1999). Communicating across these midlines requires the development of coordination among the many neurons that compose the brain. According to Palmer (1999), this coordination must be developed early in life due to the dramatic reduction in brain growth each year. While brain weight continues to increase through age twenty, the rate of weight gain decreases by half each year until the age of four, when it decreases by 30-40% for the next several years. By the age of nine, there is only a slight gain in weight each year.

Development and coordination is achieved through stimulation of the brain. The more complex the environment in which a child grows, the more active and stimulated is the brain. This stimulation causes an increase in the dendritic branching of the neurons, which allows for more and better connections between brain cells. It also increases the size of the reception area of the synaptic buttons and increases the thickness of the myelin sheath covering the axon of the neuron. This allows for more efficient transmission and reception of nerve impulses. Leppo (2000) tells us that without this stimulation, sensory pathways in the brain may not develop. She is supported by Lindsey (1998-99) who cites research from the Carnegie Corporation stating that the environment in which a child is raised affects the number of cells in the brain, the number of connections, and the way the connections are wired. The brain actually goes through a process known as “pruning” where unused dendrites become dormant and then disappear. Up to half of the brain cells go through this process, which takes place up through adolescence. Diverse stimulation of the brain will aid in retention of the dendrites and therefore, more possibilities for

communication between cells and more retention of skills and abilities (Palmer, 1999).

Palmer (1999) defines stimulation as

...the purposeful activation of beneficial electrical activity in brain cells beyond the cultural norm. Stimulation must be much more frequent, intense, and of longer duration than what is ordinarily experienced from the environment on a daily basis. (p. 2)

Exercise and movement are forms of stimulation, which take place through the exteroceptors (vision and the other senses), proprioceptors (movement and balance), interoceptors (positive emotions), and internal mental exercises (visualization, mental music, etc.). The SMART program focuses on intentionally stimulating children in this way in order to develop their brains.

The Benefits of Movement on the Brain/Cognition

During physical activity several physiological changes occur in the brain. First, there is an increase in the flow of oxygen rich blood to the brain. Second, there is an increase in the release of neurotransmitters (chemical catalysts which aid electrical impulses). There is also an increase in the amount endorphins released in the brain. Last, more neural pathways are stimulated (Summerford, 2001). Some researchers speculate that these occurrences are one way that physical activity may help increase cognitive functioning. According to Etnier et al. (1997), there have been almost 200 studies in which the relationship between exercise and cognition has been examined.

In 1936, Piaget was one of the first scholars to suggest that motor development has a positive effect on the intellectual development of children. In 1960, Kephart theorized that children with learning disabilities may actually have perceptual-motor problems. Two studies, one by Humphrey (1972) and the other by Prager (1972), tested the learning and reinforcement, respectively, of science concepts using motor activities.

Both groups scored significantly better on post-tests than did control groups, and both also scored better on extended interval tests, suggesting that they retained the knowledge better than the control groups. A study by Freides, et al. (1980) found that learning-disabled boys were frequently inferior to non-learning disabled boys when tested on motor function. In a meta-analysis of 134 studies, Etnier et al. (1997) found that there is consistently a positive correlation between cognitive functioning and exercise, albeit a small one. Corso (1999) quotes Fauth:

All people retain:
10 % of what is read,
20% of what is heard,
30% of what is seen,
50% of what is heard and seen,
70 % of what is heard, seen and said,
and 90% of what is heard, seen, said and done (p. 7)

If this is true, why not include movement as a medium for learning? If programs such as SMART can be developed and tested, we will be able to provide many children with advantages they may not have otherwise had.

What is SMART

SMART is a staff development program for producing higher levels of kindergarten and first grade pre-academic readiness and early academic achievement by enriching many typical school activities with brain stimulation components to boost performance in curriculum emphasized by the teacher (Palmer, 1999 p. 1).

SMART (Stimulating Maturity through Accelerated Readiness Training) is a cooperatively run program involving the regular classroom teacher, physical education teacher, and the administration of the school. It involves activities done at the desk, on the floor, and on the playground, and has been shown to be most successful with the students in the lowest half to one-third of development and achievement (Palmer, 1999).

SMART is based on the premise that there are “critical periods” during which the brain may be most affected by stimulation. Gabbard (1998) speculates that the “window” for motor development is prenatal to the age of 5. Fine motor control develops shortly after birth until around age 9, and behavioral functions develop until about the age of 10.

According to Palmer (1999), there are many different types of stimulating activities that can be done through SMART. Many of these activities already occur in regular classrooms, but through SMART they are done deliberately to actively stimulate the brain. Examples of desk activities are listening games, coloring, drawing, printing, second language exposure, and learning letters and numbers. These activities are done with an emphasis on tactile kinesthetic tracing saturation, eye-hand coordination development, geometric form tracing, and number visualization through domino use. Floor activities include rolling and spinning, which are forms of vestibular stimulation; eye-hand coordination activities, such as wall chart tracing; balancing; and mobility. Playground activities include bar flips, parallel bar use, overhead ladder use, and inversion (Palmer, 1999).

Another benefit of this program is that it can assist children who have persistent reflexes. Friedes et al. (1980) tell us that there “is a hierarchy of motor functions in the sense that earlier and more primitive forms of organization do not disappear from the nervous system even though they may not be observed in overt behavior.” (p. 160) For example, children who retain even partial components of the symmetric tonic neck reflex could have difficulty with muscle tone, attention, and awkwardness due to the reflex “firing off” when the child moves the head. Going through the SMART program will help this child work through this developmental delay (Palmer, 1999).

Palmer's (1999, 2001) evaluation of the program shows significant differences between kindergarteners involved in SMART and the control groups. The data collected from evaluation of the SMART program currently in use in Georgia show improved eye-hand coordination, improved eye convergence, and higher achievement on standardized test scores. My action research will seek to determine if these same results will hold true for the kindergarten students at my school.

Methods/Procedures

The purpose of this study is to determine the effectiveness of the SMART program with kindergarten children at an urban elementary school in Knoxville, TN. If found effective, SMART could be implemented with classes other than kindergarten. The data could also be used to reinforce teachers who have used the program and convince others to use, or be more committed to, the program. My research question is: Will implementing the SMART program with two kindergarten classes at Sarah Moore Greene result in improved academic success and improved motor development?

The setting is an urban elementary school (preschool-5th grade) in a mid-size city in East Tennessee. The school serves approximately 632 students of whom 81% are black, 16% are white, 2% are Hispanic, and less than .5% are Asian and Native American. The school is a Title 1 school with standardized test scores that are below national, state, and county averages. 89% of the school population receives free or reduced lunch, as well as many other services due to a Full Service School Program that has been in place for about 3 years. Also, the school population is quite transitory, so there are frequently students leaving and new students entering.

The participants for this study are 2 kindergarten classes consisting of 18 boys and 10 girls ages 5 and 6, and their homeroom teachers. Both classes were chosen

because they are typical of the current kindergarten classes at Sarah Moore Greene. The teachers of both classes describe their children as less prepared for kindergarten, and performing at a lower academic level than classes they have had in the past. Class A consists of 10 boys and 4 girls. Thirteen of the children are black and 1 is white. Class B consists of 14 children: 8 boys and 6 girls; 12 of the children are black, 1 is white and 1 is Hispanic. Both teachers are white females over the age of thirty.

The classroom teachers are currently engaging the children in SMART activities in their classrooms, as well as in the SMART Gym and their regular physical education class. They are keeping logs of the amount of time they spend in SMART activities. Beginning in January 2003, one of these classes will participate in SMART activities above and beyond what they are already doing. This class will come to the gym from 10-10:30 three days a week and participate in various sets of SMART activities. The activities will remain the same for 2 weeks, at which time new activities will be introduced. This will continue through the month of March. The activities will include spinning, creeping, alligator crawling, using the overhead ladder, hopscotch, ball bouncing, skip counting, rolling, tossing and catching and other general coordination and brain stimulation activities (See Appendix B for the log I kept detailing the activities done and the length time the children did each activity. See Appendix D for the logs kept by the homeroom teachers detailing the activities and duration thereof of the activities done in the classroom).

The participating kindergarteners will be pre-tested in October 2002 using a test used during a pilot study of the SMART program three years ago in this same school system. The test includes a figure drawing, timed count (in rate per minute and number correct), alphabet recitation (in rate per minute and number correct), letter writing (to

determine eye-hand coordination), and letter recognition. The children will also be given a motor skills test including an arm strength test (hanging on bar; measured in seconds), a test for the Landau reflex (absent or present), a coordination test using flip-flops, and a test of cross-lateral ability (the alligator crawl). See appendix C for copies of all test forms and record sheets. Both classes will also be post-tested in March of 2003 using this same test battery and the scores will be compared to determine the amount of improvement. Logs will also be compared for the amount of time each teacher dedicated to SMART activities. The two teachers will also fill out a survey (see Appendix C) in late March answering general questions about their feelings of the program and whether or not it was successful.

Findings

My research question is: Will implementing the SMART program with kindergarteners result in the improved academic and physical development of the children? The classes chosen to participate in this research were in involved in differing amounts of SMART time in order to determine if the degree of participation influences academic or physical development. The following chart shows the total amount of time (in minutes) that each class spent working on SMART activities over the course of January, February, and March of 2003. “ Other SMART activities” were those done outside of the SMART gym and the classroom.

Name	January (room)	January (Gym)	February (room)	February (gym)	March (room)	March (gym)	Other SMART Activities	Total SMART (minutes)	Total SMART (in hours)
Class A (MB)	56	140	60	160	76	200	355	1047	17.45
Class B (KC)	20	270	12	240	0	180	0	722	12.03

As shown in the log, Class A participated in the following activities in the SMART gym (led by their teacher) or in the regular gym (led by the physical education teacher): overhead ladder, the alligator crawl, flip-flops, spinning, head raises (also called turtles and seals), bean bag launchers, balance beam walking, creeping, rolling (log and pencil rolls), ball bouncing, Marsden ball use (passing and dodging), creep track use with numbers 1-10, hopscotch and jump rope. The same class, led by their teacher, participated in SMART activities in the classroom. Those activities were thumbkins, spinning, head raises, and alligator crawling. These activities were done for about 2 minutes per activity nearly every day of the week. Class A went to the regular gymnasium 15 times from January 1 until March 21. This class received instruction and supervision in the SMART activities from the physical education teacher. “Other SMART activities” were the same activities listed above, but they were done outside or in a different location.

According to the log kept by the teacher, Class B participated in the following activities in the SMART gym: overhead ladder, creeping, creep track use numbers 1-10, alligator crawl, balance beam walking, rolling (log and pencil), spinning, hopscotch, ball bouncing, Marsden ball use (dodging and passing), ball catching, flip-flops, butterflies (visual pursuits), finger touches, and head raises. Again, each of these activities was done in the SMART gym for about 2 minutes three days per week at two-week intervals. In the classroom, Class B did finger touches, head raises, butterflies, auditory discrimination, pencil tracking (visual pursuits), spinning, and flip-flops. The teacher led these activities six times from January to March in addition to the time the class spent in the SMART gym. See Appendix B for a description of all activities.

One child entered and one dropped from class A between the pre- and post-tests, while two students transferred from Class B during the same time period. The scores for these children were included in the averages of each subtest, but were not included when looking for improvement within individuals. I have made the assumption that the flow of children into or out of a class will not significantly alter the general make-up of the class.

The following chart shows the pre and post-test averages for each class for each

SMART TEST RESULTS	Figure Drawing	Rote Counting	Rote Counting	Recites Alpha	Recites Alpha	Letter Recog.	Letter Recog.
	Number of parts	Upper limit	Rate/Minute	# Correct	Rate/Minute	# Correct	Rate/Minute
Class A Average (pre)	10.00	26.83	63.99	21.33	63.19	14.08	16.35
Class A Average (post)	13.92	42.00	81.63	24.25	95.01	20.17	23.30
Difference (Pre/post)-Class A	4.92	15.17	17.64	2.92	31.82	6.08	6.95
Class B Average (pre)	15.21	31.64	50.29	19.57	58.04	10.14	7.72
Class B Average (post)	15.92	44.42	82.32	24.75	129.80	17.00	16.77
Difference (pre/post)-Class B	0.70	12.77	32.03	5.18	71.76	6.86	9.05

sub-test of the academic assessments administered for this study.

The second chart shows the number of students in each class who either improved or remained the same on each sub-test. The numerator in each box shows the number of children improving or staying the same, while the denominator in each box shows the total number of children tested.

Teacher	Figure Drawing	Rote counting		Recites Alpha		Letter Recog		Letter Writing
	# parts	Upper Limit	Rate/Minute	# correct	Rate/Minute	# correct	Rate/Minute	
Class A (MB)	10/12	8/10	7/10	8/10	6/10	9/10	8/10	10/11
Class B (KC)	8/12	9/12	10/12	10/12	12/12	10/12	10/12	12/12

Both classes showed improvement in all areas of the test; however, Class B showed more improvement than Class A, even though Class A was engaged in more time in SMART activities. Both classes showed the largest developments in the figure drawing, rote counting (both the upper limit and rate per minute), and the rate per minute of alphabet recitation. These results show that the children of both classes developed over the course of the semester; however, it is difficult to attribute that development solely to the SMART program since the group receiving more time in SMART activities did not improve more than the control group. In fact, the data show that lower amounts of SMART time could be more beneficial; however, this could be the result of many factors, and is generally inconsistent with most research, which shows a small positive correlation between exercise and cognition (Etnier et al., 1997).

Both classes also showed improvement in most subtests of the physical assessment. See the chart below for the physical assessment sub-tests and the number of children who improved in each area. The monkey bar (overhead ladder) test shows the number of children who improved in the post-test over the number tested. The Landau Reflex test shows the number of children exhibiting this reflex in the pre and post-tests over the number tested. For the flip-flop test and alligator crawl test, the numerator shows the number of children demonstrating competency in that movement pattern in the pre and post-tests respectively over the number of children tested. See Appendix C for a description of all physical assessment sub-tests.

Teacher	Monkey Bars	Landau Reflex (present)		Flip-Flops (Good)		Alligator Crawl (Good)	
		# Improved/ # Tested	Pretest	Post-test	Pretest	Post-test	Pretest
Class A (MB)	5/10 50%	3/11 27%	6/12 50%	3/11 27%	11/12 91%	3/11 27%	6/12 50%
Class B (KC)	5/12 41%	5/12 41%	3/12 25%	5/12 41%	5/12 41%	5/12 41%	11/12 91%

The children in class A improved in every sub-test of the physical assessment except for the Landau reflex test, with the most improvement seen in the flip-flop test of coordination. Class B improved in every sub-test, with the most drastic improvement seen in the alligator crawl test. These results suggest that participation in SMART activities has helped to increase the motor coordination of the children. This is supported by the data from the academic test battery, which shows 18 of 24 students improved in the figure drawing assessment, and 21 of 24 students improved in the letter writing assessment. Fine motor coordination is large part of both of these assessments.

According to the teacher surveys, the children in both classes expressed interest in doing SMART activities and were disappointed when they were unable to do so. One teacher wrote that her class seemed more focused after doing SMART activities while the other teacher wrote that her children improved in the area of coordination and physical development. They also showed improvement in the area of handwriting but this teacher did not attribute these improvements to SMART, saying that they practiced writing every day.

Conclusions

Based on the research I did, it appears that SMART may have helped in the academic and physical development of the kindergarten classes that participated in the

study, although the data do show more improvement in the physical assessment.

However, it is difficult to draw definitive conclusions to this effect for several reasons.

First, it was not possible in this study to remove other factors that may have influenced development. For example, the children should mature to some extent without SMART as the year passes. Second, the kindergarten teachers are also using other methods to teach letter recognition, counting, and fine motor coordination just to name a few.

Finally, these teachers have been using the SMART program since the beginning of the school year, but I only collected data from January through March. This makes it difficult to determine the effectiveness of the activities done during these three months.

Also of interest is the fact that the class receiving less SMART training showed more improvement on the academic assessment. This could be true for several reasons. First, this study occurred during the second semester. Perhaps the children were already well on their way to developing the physical coordination needed to improve their learning ability. If this is true, then SMART would be more beneficial earlier in the year, when the children have more of a need to develop gross and fine muscle coordination. Second, it is possible that this happened by chance. In order to reduce the likelihood of chance playing a factor in the testing, I would have to test the children more than once after SMART training and compare the scores. This would improve the reliability of this test. It is also possible that less SMART training actually did result in improved academic performance. Perhaps spending less time engaged in SMART activities resulted in more time to cover basic kindergarten academic topics. This is difficult to determine, though, since many SMART activities are imbedded in the regular kindergarten curriculum and should reinforce what is being taught. Separating the curriculum and SMART activities is not possible in most cases, at least if SMART is

done correctly. In order to test this, I would have to structure this intervention differently.

My study does generally support Etnier et al. (1997) who found a small, consistent positive correlation between exercise and cognitive functioning in the meta-analysis of 134 studies. Class A showed the most improvement on the flip-flop and alligator crawl sub-tests of the physical assessment. Both of these tests are tests of coordination, homolateral and cross lateral respectively. Class B showed improvement on the alligator crawl test, but remained the same on the flip-flop test. Both classes showed improvement on all sub-tests of the academic test battery. This data supports Piaget (1936) who suggests that motor development has a positive effect on intellectual development of children.

At the very least, the children are enjoying movement (as stated in the teacher surveys) and developing physical coordination. Hopefully, this physical development and coordination are positively influencing their academic development. However, this study could not determine this connection definitively.

Referring to Fauth, as discussed by Corso (1999), all people retain more information when that information is experienced through a multitude of modalities (people retain 90% of what is heard, said, seen and done). Therefore, any time children can experience information through movement, it will aid in the retention and understanding of that information. This knowledge should encourage teachers and others working with children to find ways to include movement when teaching academic information. Physical educators should also be encouraged to integrate academic subjects into the movement activities they are already doing. Incorporating movement in

this way will only help the physical and academic development of children as they grow and learn.

The problem stated in the introduction of the literature review of this paper is that there are many children at my school who are working below grade level. The overall goal of all programs at my school is to increase the achievement scores of our children. This is also a goal of SMART. Increasing the reading readiness of the kindergarteners through the SMART program should positively influence their scores in first grade because they will be more ready to for reading and writing on a first grade level. Again, my study could not confirm the effectiveness of SMART, but the data do show that both classes improved their scores on both the physical and academic assessments.

Discussion/Recommendations

There are several limitations to this study. Time and person power prohibited me from testing all of the children in kindergarten. I tested only 2 of the 6 classes, so it is a small sample of children. As stated earlier, maturation is a threat to the validity of the study. The children will develop physically and academically simply by being in kindergarten, so it is difficult to know how much of their development to attribute to SMART. Finally, there are a few more sub-tests of the academic battery that can be done in addition to the ones I did. I did not have time during this study to complete the entire battery. Tests could also be added to the physical assessment battery to expand it if more time were allowed.

My action was basically the same as what I planned, except for two items. First, there were several days that I had planned to have Class A come to the gym for their extra SMART time, but had to cancel due to school activities such as picture day, the spelling bee, and field trips. It was more difficult to have them come to the gym than I

had anticipated. Second, there was a class, unrelated to the study, which came to the gym with Class A because the two classes had been doing the SMART activities together prior to my study. This meant that there were more children in each group, and therefore, fewer repetitions of each activity for the children in Class A.

Changes I would make if doing this research again would include the following:

1. Split the study into 2 different parts; One would cover only academic improvement while the other would deal with only physical development
2. Limit the extra time in the gym to only the class in the study
3. Do the extra SMART time in a location other than the gym that would be less susceptible to schedule changes
4. Specify the activities that the teachers would do in the classroom instead of leaving it up to them
5. Extend the time of the study to be over the course of an entire school year instead of only 3 months
6. Have half the classes participate in no SMART activities at all and the other half participate in regular SMART activities in order to try and better determine the extent of the effectiveness of the program

Future studies could encompass any of the above ideas, especially number 6. This would provide greater differences in the action and create a more valid study. This study should also be done with more children in order to improve general ability to other children. Research should also be done on special education students to determine if a program such as SMART could assist them in their educational needs. This type of

research would support work done by Kephart (1960) who suggested that children with learning disabilities instead have perceptual motor problems.

The correlation between exercise/physical activity and academic development is one that will require much research, however many stand to benefit from such work. Common sense tells us that children need to move, but if we could learn how to gain positive “side-effects” from this movement, we could focus their movement to aid their academic development in whatever area is needed. Movement is a necessary, important part of every person’s experience as he/she grows and develops and a way to bring fun and creativity to subjects learned in school. This is where the SMART program can guide teachers and help them provide their students with movement that is meaningful, yet fun; movement that improves coordination and physical development, and in so doing prepares them, body and mind, for learning. While there is much research that still needs to be done on the SMART program, the current research does show positive results, and what better medium do we have for children to learn than through their own bodies?

Appendix A

(Activities taken from
“A Chance to Learn” Curriculum)

Appendix B

Appendix C

Appendix D

Bibliography

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Description of Physical Assessment

1. Landau Reflex Test: The child lays face down on the floor with his/her forehead on the floor and arms down at his/her sides. The instructor counts in the following manner, “Up, 2, 3, 4, Down, 2, 3, 4”. As the instructor counts the child slowly lifts and lowers the head to the count. The instructor is looking at the child’s feet and legs to see if they elevate when the child lifts the head. If the feet elevate, persistent Landau reflex is present.
2. Overhead Ladder Hang: The child uses an overhand grip to hang from a rung of the overhead ladder. The instructor times the child to see how long the child can hang. This is a test of arm strength.
3. Flip-Flop Coordination Test: The child lies on his/her stomach with one cheek on the floor. One arm should be in an up-position with the elbow bent, and the other down. The head is turned toward the raised hand. For homolateral flip-flops the same-side leg should be bent as if attached to the elbow by a string. For cross-lateral flip-flops, the opposite knee should be bent. On the signal “flip”, the child switches the arm and leg in the up-position, and turns the head to the opposite side. On the signal “flop”, the child switches back. The instructor should look to see if the child could switch all body parts in a coordinated fashion.
4. Alligator Crawl: The child lies on his/her stomach and crawls using a cross-lateral pattern. The child should keep the chest on the floor, push with one foot and pull with the opposite hand. This is a test of basic coordination and integration of both sides of the brain.