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EFFECT OF EDUCATIONAL KINESIOLOGY ON STATIC BALANCE OF LEARNING DISABLED STUDENTS[1]

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Summary.—Educational Kinesiology is a movement-based program designed to enhance academic performance and may also influence performance of motor skills. The purpose of this study was to determine whether the Educational Kinesiology techniques of repatterning and/or integration movements affected static balance of 60 learning disabled students, ranging in age from 7 to 11 yr. Subjects were matched on age and sex and assigned to one of three groups: control, movement, or repatterned. Children in the repatterned group received a 10-min. individual session of combined arm and leg movements coordinated with eye-placements prior to the start of the 6-wk. program. Both treatment groups then participated in a movement program for 5 min. twice a day, 5 days a week for 6 wk. The control group received no exposure to these special techniques. Static balance was pretested and posttested in each group using the Modified Stork Stand test. A one-way analysis of variance indicated a significant difference between groups. A Scheffé *post hoc* test showed that the repatterned group improved more than the movement group, who in turn improved more than the control group.

Balance is important in the development and performance of many motor skills. Various researchers (1, 3, 4) have considered balance to be associated with motor ability, motor educability, and kinesthesis. Balance has been generally considered fundamental in physical education and a prerequisite for motor skills. Woollacott, Debu, and Shumway-Cook (12) indicated "that the development of the postural response system will strongly influence the development of voluntary motor control" (p. 2). They further suggest that the ability to maintain balance during incongruous sensory signals does not seem to mature until about seven to ten years of age.

Many studies have examined the ability of children in special education to perform balance tasks. Both educable and trainable mentally retarded children lag behind children of normal intelligence in the development of gross motor skills (11). This knowledge had led to the development of remedial programs for these children. Arnheim and Sinclair (1) developed a modified version of the "stork stand" test to evaluate the static balance of boys and girls while the eyes are open and with the eyes closed, using minimal equipment.

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Over the past 30 years, various perceptual motor programs have been developed to remediate learning disabilities through movement patterning. Delacato (5) presented a system of neurophysiological organization which establishes normal patterns of motor behavior through passive and active movements based on normal reflexive behavior. The approach of Educational Kinesiology (6) is partially an outgrowth of the "cross-crawl" research of Delacato and is designed to develop "whole-brain" learning through the use of motor activities.

This practical and dynamic method uses simple body movements to integrate brain function. It incorporates techniques and information from many different fields, including yoga, acupuncture, applied kinesiology, neurolinguistic programming, psychology, growth and development, and brain research. Dennison assumes that, when an individual is under stress, the body tends to act from only one hemispheric mode. Educational Kinesiology has been proposed as a means of integrating hemispheric functioning to reduce blockages caused by stress, allowing optimal body function.

Research (9, 10) indicates improvement in various academic areas, but there is little information on the improvement of motor skills after experiencing the movement activities in Dennison's program. This study was done to assess whether the integration movements or repatterning specified in the program affect static balance of learning disabled elementary students.

METHOD

Sixty elementary students from the Chino Unified School District in California participated in the study. There were two boys and two girls at each age from 7 to 11 yr., and all were classified as learning handicapped according to state criteria. The parents of each child were informed about the testing procedures, and consent was given for participation prior to the beginning of the study.

A 3-ft. balance board, which was 1.7 in. by 1 in. was used for the modified version of the "stork stand" test (1). Children were blindfolded and duration of balance was measured with a stopwatch.

The subjects were matched on age and sex and were assigned to one of three groups: control, movement, or repatterned. Each group was pretested on the stork stand prior to the beginning of the treatment program. The investigator demonstrated on the balance board on the floor, explaining that first the preferred foot and then the other foot would be tested. While balancing, the hands were kept on the hips and the nonsupporting foot was hooked behind the knee of the supporting leg. With eyes open and with eyes closed or blindfolded the child was given one practice trial with each foot. Each child was then given three 10-sec. trials in each of the four conditions: left leg, eyes open; left leg, eyes closed; right leg, eyes open; and right leg, eyes closed. The means for the three trials in each condition were combined as the total balance score, with a total of 40 sec. possible.

During the week following the pretest, children given the repatterning procedure experienced a 10-min. individual session devoted to homolateral and contralateral arm and leg movements in combination with a specified eye movement to access the appropriate hemisphere of the brain. This procedure is described elsewhere (7). This 10-min. session was the only distinction between the treatment groups.

Both the movement group and the repatterned group then entered a 6-wk. treatment program, using four of the basic movements in Educational Kinesiology: Cook's hook-up, positive points, cross-crawl, and thinking cap. See the Appendix (p. 54) for a description of each movement. The program was conducted by the classroom teachers and was scheduled five days per week, two times per day. The treatment groups engaged in 5 min. of movements in the morning after arriving at school and again after lunch. Children in the control group were not involved in any Educational Kinesiology activities. After the six weeks, all groups were again tested using the modified stork stand described previously.

RESULTS

The means and standard deviations of seconds in balance are presented by group in Table 1. A one-way analysis of variance of the pretest times indicated no significant difference ($F_{2,57} = 2.56$, $p > .05$) among groups, indicating that the groups were equivalent prior to treatment.

A gain score was computed by subtracting the pretest score from the posttest score for each student. A one-way analysis of variance was then computed on gain scores to assess significance of differences in improvement in balance by groups. The treatment effect was significant ($F_{2,57} = 22.92$, $p = .0001$), based upon the following mean group changes: control = .3 sec. ($SD = 2.5$), movement = 4.9 sec. ($SD = 2.4$), and the repatterned = 7.6 sec. ($SD = 4.9$), respectively. A Scheffé *post hoc* analysis indicated that all means were significantly different, and the repatterned group showed the greatest improvement from the lowest initial level, followed by the movement group, and the control group, respectively.

These results support the notion that the treatment program is effective in improving the static balance of learning disabled children of elementary school age. The four movements practiced twice a day were effective in improving their static balance. However, individuals who experienced the repatterning session which incorporated contralateral movements in combination with eye-positioning showed an even greater improvement in their performance than those who were involved in the movement program only. Their initial mean level was well below those of the other two groups.

TABLE 1
GROUP MEANS AND STANDARD DEVIATIONS IN SECONDS FOR THREE GROUPS OF 20 STUDENTS ON THE MODIFIED STORK STAND TEST

Group	Pretest Scores		Posttest Scores	
	M	*SD*	*M*	*SD*
Control	16.45	7.69	16.79	8.31
Movement	18.90	6.49	23.81	6.34
Repatterned	14.04	6.13	21.65	6.35

Note.—Maximum score = 40 sec.

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APPENDIX

EDUCATIONAL KINESIOLOGY MOVEMENTS*

COOK'S HOOK-UP:

A. Phase I
   2. Hold left ankle with right hand.
   3. Hold the ball of left foot with left hand.
   4. Relax and breathe deeply with tongue against roof of mouth on inhale and behind teeth on exhale.

   Hold the posture for at least one minute.

B. Phase II
   1. Sitting with both feet on the floor, touch the fingers of one hand against the fingers of the other.
   2. Continue to breathe deeply, as before.

   Hold for at least one minute.

POSITIVE POINTS: The positive points are neurovascular holding points on the frontal eminences found halfway between the eyebrows and the hairline. When lightly held, by oneself or another, these points are thought to be helpful to repattern conditioned responses to emotionally charged thoughts about people, places, memories, tasks, and environmental factors. Children were asked to repeat the phrase, "I like myself, I do my best," while touching these points.

CROSS-CRAWL: Touching hand to opposite knee (as in marching movement), for 10 to 20 repetitions. (Each side once is a full repetition.) The children were instructed to look all around the room while doing this movement to activate all brain centers.

THINKING CAP: Unfold the ears, from top to bottom, three times each.

*From Dennison & Hargrove (7), adapted by permission.