The purpose of this study was to investigate the effect of an eight-week instructional program, using different activities and apparatus, upon the balance performance of hearing-impaired children, ages 6-12. Balance was measured by the Bruininks-Oseretsky Test of Motor Proficiency (Subtest 2: Balance) as a pre- and post-test to determine if any significant changes in balance performance occurred due to the eight-week instructional program. Thirty-four hearing-impaired students from the Oregon School for the Deaf (OSSD), Salem, Oregon served as subjects in this study. Seventeen students were randomly assigned in each of the experimental and control groups. Subjects in the experimental group were exposed to an eight-week balance program activities, while the control group participated in the OSSD physical education curriculum without any special emphasis on balance activities. The eight items which comprised the balance test of the Bruininks-Oseretsky Test of Motor Proficiency were
administered to the subjects in the manner suggested in the test manual. A total communication system was utilized to insure that the students understood the test directions.

One-way analysis of covariance was selected as the appropriate statistical tool to determine if any significant difference existed between experimental and control groups regarding the effect of an eight-week instructional program upon the acquisition and improvement of balance performance (static and dynamic). The pre-test served as the covariant and was used as the reference for comparison to the post-test.

The results of this study indicated that an eight-week instructional balance program, using different activities and apparatus, increased the total balance performance among hearing-impaired children, ages 6-12. This research also established that the experimental group experienced a statistically significant increase over the control group in the dynamic balance in response to the prescribed balance program. In regard to static balance, the results showed no significant difference between the adjusted experimental and control group scores, over an eight-week period. On the basis of the findings of this study and within the limits of the investigation, the conclusion was made that the eight-week instructional balance program, as outlined in this study, increased the total balance performance among hearing-impaired children, ages 6-12.
The Effect of an Eight-Week Instructional Program Upon the Balance Performance of Hearing-Impaired Children Ages 6-12

by

Adel Aly Hassan

A THESIS
submitted to
Oregon State University

in partial fulfillment of the requirements for the degree of
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DEDICATION

THIS THESIS IS DEDICATED TO MY WIFE BAHIA EL-BADEN
FOR WITHOUT HER LOVE, FAITH, AND ENCOURAGEMENT
THIS GOAL MAY NEVER HAVE BEEN ATTAINED.
ACKNOWLEDGEMENTS

Many caring people have given invaluable assistance in the completion of this study.

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TABLE OF CONTENTS

I. INTRODUCTION ........................................ 1
   Purpose of the Study ................................ 2
   Definitions and/or Explanation of Terms .......... 3
   Statement of the Problem ............................ 7
   Hypotheses ........................................... 7
   Assumptions ......................................... 8

II. REVIEW OF RELATED LITERATURE ..................... 9
   Dynamic and Static Balance............................ 9
   The Relationship Between Sensory Organs and Balance .. 11
   Techniques for Measuring Balance ....................... 20
   Research Related to Motor and Balance Skills of the Deaf Compared with Those of Hearing Children .. 25
   Summary ............................................. 35

III. METHODS AND PROCEDURES .......................... 38
   Selection of Subjects ................................ 38
   Selection of Instrument ................................ 42
   Instructional Balance Program (Treatment) ........... 45
   Design of the Study .................................. 51
   Statistical Analysis .................................. 54

IV. ANALYSIS AND DISCUSSION OF THE FINDINGS ......... 57
   Findings ............................................. 58
   Summary of Findings and Discussion ................. 71

V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS .... 80
   Summary ............................................. 80
   Conclusions .......................................... 82
   Recommendations for Future Studies .................... 82

BIBLIOGRAPHY ............................................ 85

APPENDICES .............................................. 91
<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Inner ear</td>
<td>12</td>
</tr>
<tr>
<td>2.</td>
<td>Nervous mechanisms of equilibrium</td>
<td>14</td>
</tr>
<tr>
<td>3.</td>
<td>Regression lines for experimental and control groups on pre- and post-test score for static balance</td>
<td>61</td>
</tr>
<tr>
<td>4.</td>
<td>Regression lines and 95% confidence band describe the linear relationship for experimental and control groups between pre- and post-static scores.</td>
<td>62</td>
</tr>
<tr>
<td>5.</td>
<td>Regression lines and 95% confidence band describe the linear relationship for experimental and control groups between pre- and post-dynamic scores</td>
<td>66</td>
</tr>
<tr>
<td>6.</td>
<td>Regression lines for experimental and control groups on pre- and post-test score for total balance</td>
<td>69</td>
</tr>
<tr>
<td>7.</td>
<td>Regression lines and 95% confidence band describe the linear relationship for experimental and control groups between pre- and post-total balance scores</td>
<td>70</td>
</tr>
<tr>
<td>8.</td>
<td>Mean static balance scores of pre- and post-test (experimental and control groups)</td>
<td>73</td>
</tr>
<tr>
<td>9.</td>
<td>Mean dynamic balance scores of pre- and post-test (experimental and control groups)</td>
<td>75</td>
</tr>
<tr>
<td>10.</td>
<td>Mean total balance scores of pre- and post-test (experimental and control groups)</td>
<td>78</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>Description of the Study Population for Experimental and Control Groups</td>
<td>39</td>
</tr>
<tr>
<td>II.</td>
<td>Sex by Degree of Hearing Loss for the Experimental and Control Groups</td>
<td>40</td>
</tr>
<tr>
<td>III.</td>
<td>Number and Percentage of Reported Causes of Hearing-Impairment in Both the Experimental and Control Groups</td>
<td>41</td>
</tr>
<tr>
<td>IV.</td>
<td>Eight-Week Plan for Balance Unit</td>
<td>50</td>
</tr>
<tr>
<td>V.</td>
<td>Design Matrix</td>
<td>52</td>
</tr>
<tr>
<td>VI.</td>
<td>Analysis of Covariance</td>
<td>55</td>
</tr>
<tr>
<td>VII.</td>
<td>Pre- and Post-Test Means and Mean Differences for Static Balance</td>
<td>58</td>
</tr>
<tr>
<td>VIII.</td>
<td>Analysis of Covariance of the Difference Between Pre- and Post-Test for Static Balance</td>
<td>59</td>
</tr>
<tr>
<td>IX.</td>
<td>Pre- and Post-Test Means and Mean Differences for Dynamic Balance</td>
<td>63</td>
</tr>
<tr>
<td>X.</td>
<td>Analysis of Covariance of the Difference Between Pre- and Post-Test for Dynamic Balance</td>
<td>64</td>
</tr>
<tr>
<td>XI.</td>
<td>Pre- and Post-Test Means and Mean Differences for Total Balance</td>
<td>65</td>
</tr>
<tr>
<td>XII.</td>
<td>Analysis of Covariance of the Difference Between Pre- and Post-Test for the Total Balance</td>
<td>67</td>
</tr>
<tr>
<td>XIII.</td>
<td>Mean and Standard Deviation of the Pre- and Post-Test Scores for the Static Balance Variable</td>
<td>72</td>
</tr>
<tr>
<td>XIV.</td>
<td>Mean and Standard Deviation of the Pre- and Post-Test Scores for the Dynamic Balance Variable</td>
<td>74</td>
</tr>
<tr>
<td>XV.</td>
<td>Mean and Standard Deviation of Pre- and Post-Test Scores for the Total Balance</td>
<td>77</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

Balance, an important element of motor ability, depends to a great extent upon the proper functioning of the inner ear, and its relationship to body equilibrium. Some deaf children will have balance problems due to damage or dysfunction of the inner ear. If the semicircular canal function is impaired, individuals will have difficulty maintaining equilibrium, until the other senses compensate for this deficiency (Padden, 1959). However, not all deafness is the result of inner ear defects; there are many deaf individuals whose sense of balance is not affected. Unless the semicircular canals, which contain the organ of corti and the endolymph of the inner ear are damaged, balance and equilibrium are not necessarily affected (Shapira, 1975). Myklebust (1946) conducted several studies which indicated that deaf children as a group displayed inferior static balance skill, as compared to hearing children, and that the deaf, in general, had poorer dynamic balance. Furthermore, he also stated that deaf children who had meningitis were significantly inferior in balance skills to all other etiological classifications of deaf children.

Several descriptive research studies (Boyd, 1967; Ewing,
1957; Grimsley, 1972; Long, 1932; Morsh, 1936; Myklebust, 1946; and Vance, 1968), have confirmed that the deaf display significantly poorer static and/or dynamic balance than do hearing children. A problem exists, however, in that no attempt has been made to indicate whether the hearing-impaired can improve their balance performance through a specific physical activity program. Lindsey and O'Neal (1976), Pennella (1979), Berges (1969), and Case (1973), all recommended that further research be conducted to ascertain what kinds of programs or activities may be effective in eliminating or improving the known balance deficits. The major purpose of this study was to determine the effectiveness of an eight-week instructional program, using different activities and apparatus, upon the balance performance, (static and dynamic), of hearing-impaired children, ages 6-12.

Purpose of the Study

The purpose of this study was to investigate the effect of an eight-week instructional program upon the balance performances, (static and dynamic), of hearing-impaired children. A comparison between experimental and control group performances was made to determine if there were any significant differences in the balance performance as a result of such a program. Thirty-four hearing-impaired students from the Oregon State School for the Deaf served as subjects in this study. Seven
girls and ten boys in the experimental group, five girls and twelve boys in the control group. Subjects in the experimental group were exposed to an eight-week program of balance activities, for four 30-minute instructional sessions per week. The control group participated in the deaf school's physical education curriculum without any special emphasis on balance activities. The Bruininks-Oseretsky Test of Motor Proficiency, (Subtest 2: Balance), was administered as a pre- and post-test to ascertain if any significant changes in balance performance occurred. The effectiveness of the instructional program was determined by noting whether or not the groups differed in their static, dynamic, and total balance at the end of the instructional period.

Definitions and/or Explanation of Terms

For the purpose of clarification, the following definitions and/or explanations of terms were established for use in this study.

**Balance**: The ability to maintain equilibrium while engaging in various locomotor or nonlocomotor activities. (Arnheim, 1979)

**Static Balance**: The ability to maintain a specific position for a given period of time. Static balance can only be accomplished when the center of gravity is above the body's base of support. (Arnheim, 1979)
Dynamic Balance: The ability to control the body while moving. Dynamic balance can be maintained when the body alternately loses and regains equilibrium. (Arnheim, 1979)

Hearing-Impairment: Any malfunction of the auditory process which is established by audiometric or impedance testing. If it is stated as a numerical decibel (dB) the amount of loss is obtained by averaging the dB loss at 500, 100, and 2000 hertz of the better ear, (pure-tone average). (Schmidt, 1981)

Hearing Level: The student's unaided average pure-tone threshold in the better ear (BEA) at 500, 1000, and 2000 Hz, expressed in db (Karchmer, 1979). The hearing loss is measured in terms of decibel loss. The decibel level, (expressed as a numerical figure), refers to the increase of units of sound that are required for a hard of hearing person to hear at the same level at which the normal person hears. To illustrate, for a person with an auditory loss of 20 decibels to hear a sound at the same level as someone with normal hearing, an increase of 20 decibels in the sound is necessary (Fait, 1978). Degrees of hearing loss are classified differently by different authorities, but for the remainder of this research project three categories of hearing-impaired loss will be used: 1) less than severe (<70 db), 2) severe (70-90 db), 3) profound (>90 db). (Karchmer, 1979)
Etiology of Hearing-Impairment: The schemata for etiological grouping (causes), may be logically categorized in the following manner:

1. Hereditary Group (Endogenous) - a genetic or hereditary loss is a profound, irreversible, bilateral sensorineural hearing loss of early onset. Most patients with hereditary deafness have intact and functional vestibular systems (Northern & Down, 1978). There is strong evidence that congenital deafness runs in some families. It may be transmitted to children by parents who have normal hearing, but carry the genes for deafness. Various studies of the deaf school-age population in the United States have found that from 16 to 30 percent of all deaf children have deaf relatives. (Reis, 1973)

2. Post-Natal Group (Exogenous) - Post-Natal refers to the period after birth when as a result of illness or injury, e.g., meningitis, a bacterial or viral infection can destroy the sensitive acoustic apparatus of the inner ear. Severe difficulties in balance may also result. (Myklebust, 1946)

3. Pre-Natal Group (Rubella) - Rubella (German measles) is the major non-genetic cause of childhood deafness. (Masland, 1968)

4. Undetermined Etiology - This refers to the cause unknown.
**Inner Ear:** The inner ear can be subdivided into the three semicircular canals, the vestibular, the cochlea, and the auditory nerve. The inner ear, called a labyrinth because of its intricate structure, is divided into the bony labyrinth, or outer hard shell, and the membranous labyrinth, which lines the bony portion. Important to both functions of hearing and balance is the fluid in the inner ear. The inner ear governs both the function of hearing and balance. A hearing loss therefore, often affects balance. (Sherrill, 1976)

**Vestibular Apparatus:** The sensory receptors for balance are located within the vestibular apparatus, which consists of the three semicircular canals, the utricle, and the saccule. The vestibular, or labyrinthine, sense enables the body to relate to the gravitational field by detecting changes in both static and dynamic balance. (Sherrill, 1976)

**Kinesthetic (proprioceptive):** The discrimination of the positions and movements of body parts based on information other than visual, auditory or verbal. Kines thesis is believed to underlie many discriminating functions of the body required for successful motor skill performance: locomotion, perception of pressure changes, balance and body equilibrium, and overall body coordination. Its presence is thought to contribute to an individual's ability to learn, as well as to perform motor skills. (Cratty, 1975)
Statement of the Problem

The problem investigated in this study was to determine if an eight-week instructional program would have an effect on the improvement of static and dynamic balance performance among hearing-impaired children.

The first objective was to develop a curriculum and instructional activities focusing on both dynamic and static balance.

The second objective was to measure the balance ability in a group of hearing-impaired children. The testing occurred at the beginning of the program and again after eight weeks of balance training to determine if there had been a significant improvement in the balance skills of the experimental and control groups.

The third objective was to make appropriate recommendations regarding the utility of the specific eight-week instructional program.

Hypotheses

Three null hypotheses were selected for use in this study:

1. There is no significant difference between experimental and control groups in the static balance scores after an eight-week instructional program.

2. There is no significant difference between experimental and control groups in the dynamic
balance scores after an eight-week instructional program.

3. There is no significant difference between experimental and control groups in the total balance scores after an eight-week instructional program.

Assumptions

The following assumptions underlie the present study:

1. Some deaf children have balance problems due to the damage to their inner ear. If the semicircular canal function is impaired, the individual will have difficulty in maintaining equilibrium. Individuals with inner ear damage compensate by using visual, kinesthetic (proprioceptors), and/or touch senses to maintain balance.

2. If there is a causal relationship between maintaining equilibrium and senses other than hearing, then an instructional program of balance activities utilizing vision, kinesthetics and tactile sensations, will likely be effective in improving balance.
CHAPTER II

REVIEW OF RELATED LITERATURE

Presented in this chapter is a comprehensive review of research on balance and its relationship to hearing-impaired and deaf children. The chapter is divided into four major areas pertaining to balance: dynamic and static balance; sensory organs and balance; measurement of balance; and studies of motor ability and balance related to the deaf.

**Dynamic and Static Balance**

Historically, postural balance has been categorized into two related although different subjects, namely, static equilibrium (maintenance of relatively fixed postures) and dynamic equilibrium (the act of establishing equilibrium or gaining bodily orientation in relation to gravity). Static equilibrium has been described as a continuous tonic contraction of certain skeletal muscles, e.g., in sitting and standing. Dynamic equilibrium is the reorientation of the body or reestablishment of equilibrium after the body has been thrown off balance in relation to gravity, as when the body is in motion (Travis, 1945). Also, the bodily adjustment and behavior associated with simple rectilinear and rotary accelerations, such as dizziness, vertigo, and nystagmus are phenomena of dynamic equilibrium. Furthermore, certain movement
patterns in locomotion like running and jumping, where bodily orientation is maintained despite interrupted contacts with the ground or fixed surfaces, may be considered important aspects of dynamic equilibrium.

Travis (1945) has discussed the relationship between static and dynamic balance.

The distinction between static equilibrium and dynamic equilibrium in man presumably rests upon the differences between reflex, ballistic motor patterns on the lower brain and spinal cord levels and the fine coordinated motor patterns on the mid-brain and cortical levels. This distinction is the logical result of the viewpoint of "hierarchial functioning" of neural centers from the simplest to the more complex levels. From the viewpoint of "unitary functioning" of the nervous system the distinction between static and dynamic equilibrium is more apparent than real. (Travis, p. 216, 1945)

The various components and differences between dynamic and static equilibrium were investigated by Travis (1945) using a stabilometer and an ataxiameter. He reported that the dynamic components of equilibrium, characterized as an orientation, perceptual-motor adjustment of the body while in motion in relation to gravity, are

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1 Stabilometer is an instrument which consists of a horizontally pivoted board upon which the subject stood erect, with his feet 14 inches apart and straddling the supporting axle. (Bachman, 1961)

2 Ataxiameter is an apparatus which consists of a square wooden frame adjusted vertically to the subject's height. The subject stands inside this frame wearing a cap to which are attached four threads leading to four counters set at each corner of the frame. Any head movement is recorded by one or more of these counters. This system then provides a numerical record of body sway. (Dickinson, 1976)
quite unrelated to the static components, characterized as a continuous tonic reaction in maintaining fixed positions of the body in relation to gravity. This unrelatedness is indicated in the approximately zero correlation between performance on the stabilometer and the amount of body sway at the head in the standing position. These results are in agreement with those findings from Graybiel and Fregly (1965), who found no significant correlation in subjects' ability to stand on a narrow beam and the ability to walk along a beam.

The Relationship Between Sensory Organs and Balance

Heath (1944) indicated four sensory organs which contribute to the maintenance of body equilibrium: inner ear (semicircular canals), vision, touch, and the end organs of the kinesthetic sense (the proprioceptors in the muscles, tendons, and joints). The following is a brief discussion explaining the effect of each one of these organs on balance skill.

Inner Ear

In order to understand the functioning of the inner ear as related to balance, a brief presentation of anatomy is necessary. Figure 1 shows the inner ear to be subdivided into four parts: a) the three semicircular canals which are superior, lateral and posterior; b) the vestibule; c) the cochlea; and d) the auditory nerve.
FIGURE 1. Inner Ear: The cochlea is concerned with audition. The semicircular canals, and vestibule are essential for equilibration. (From Langley, L.L., & Cheraskin, E. Physiology of Man. New York: Van Nostrand, 1965.)

The inner ear, called a labyrinth because of its intricate structure, is divided into bony labyrinth, or outer hard shell, and the membranous labyrinth which lines the bony portion. Important to both the functions of hearing and balance is the fluid in the inner ear. Any change in the position of the head also causes this fluid to move in an effort to preserve balance.

Sherrill explains the importance of the inner ear on balance.

The inner ear governs both the functions of hearing and balance. A hearing loss therefore often affects the balance. Specifically, the sensory receptors for sound are within the Organ of Corti, which is located within the cochlea and surrounded by endolymph. (Sherrill, p. 318, 1976)
The vestibular, or labyrinthine, enables the body to relate to the gravitational field by detecting changes in both static and dynamic balance. Static balance is governed primarily by changes in head position which are detected by hair cells within the utricle, also called the otolith organ. Changes in dynamic balance, including the body righting flexes, are detected by hair cells within the fluid-filled ducts of the semicircular canals. The hair cells within the vestibular apparatus connect with thousands of nerve fibers which form the vestibular branch of the auditory nerve. Sensory impulses reporting changes in position are transmitted to the cerebellum via the vestibulospinal tract. Disorders of balance therefore can be traced more or less to four anatomical sites: 1) the cerebellum, 2) the vestibulospinal tract, 3) the vestibular branch of the auditory nerve, and 4) the inner ear. (Sherrill, 1976)

Drowatzky has also explained the nervous system mechanism of equilibrium.

Balance is controlled by the central nervous system through sensations originating in the vestibular apparatus of the muscles of equilibrium (Fig. 2). From these sources, the nervous impulses travel to the lower brain stem, which has two types of motor functions: supporting the body against gravity and maintaining equilibrium. These functions become integrated with rhythmic circuits in the central nervous system for locomotion. Other central nervous system components, such as the cerebellum, are also involved in balance and locomotion, so the maintenance of equilibrium is not a simple neurological process. (Drowatzky, p. 184, 185, 1975)
Vestibular dysfunction is frequent in deaf populations and at times indicative of etiology. Absence of nystagmus response and the inability to perform certain motor tasks is frequently attributed in deaf population to meningitis.

Vision

The fact that vision does play an important part in balance ability has been effectively demonstrated by Dickinson (1968). He explained that blind children have great difficulty in standing on a balance beam, and that they demonstrated balance ability scores inferior to
sighted children. These blind children were also found to balance no better than sighted adults blindfolded. This indicates not only that vision is highly important in normal balancing, but also that little compensation for absence of visual cues is possible for the blind under normal conditions.

Vision assists in providing information about the body's position with regard to its environment. Even with destruction of the vestibular apparatus, vision can compensate and allow the person to maintain a degree of equilibrium (Dickinson, 1968). Voluntary movement, directed from a cortical center, allows one to have a conscious awareness of the body's position and whether the body is balanced.

The phenomenon of deteriorating performance following the removal of visual cues has been demonstrated in both static and dynamic balance. To determine the influence of visual cues on dynamic balance, a study of 22 college men and 22 college women was conducted by Travis (1945). Each subject was given eight one-minute trials to stand on the platform of a stabilometer with visual cues and rest periods of one minute between trials. After a few minutes' rest, eight one-minute trials were begun, with the subjects blindfolded and rest periods of one minute between trials. The results showed that the subjects' performance of dynamic balance skill in the situation with visual cues was almost three times as
effective as with the blindfolded technique. Another study designed by Dickinson (1968) to test the dynamic balance ability of 60 adult males under a minimal visual cue situation consisted of having subject walk along a 12-foot beam which was 2 inches wide. The subjects were randomly divided into six groups and the conclusion was drawn that: 1) subjects tended to rely heavily on visual information when it was available, and 2) the direction of attention to kinesthetic information as a result of blindfolding the subjects produced significantly better results.

In an effort to investigate the effect of vision on static balance, Travis (1945), used the ataxiameter to measure balance in a standing position (lateral and antero-posterior planes) under two conditions: with eyes open and with eyes closed. Six trials were given: three one-minute trials with the dominant eye aligning the head on a circle and three one-minute trials with the eyes closed. Rest periods of one minute were provided between all trials. The results indicated that a fine visual point of reference for the dominant eye is of great importance in controlling static balance. In the trials with eyes closed, static balance was difficult to maintain. These findings confirm and strengthen the conclusions of other studies, notably Miles (1950) and Edwards (1946), which indicated that body sway in sighted adults increased by as much as 50 percent when visual cues were removed, and
about 100 percent when vision was eliminated by closing
the eyes or by decreasing the illumination to the point
of complete darkness. In additions, Witkin and Wapner
(1950) have established a systematic relationship between
the nature of the visual field and the degree of steadi-
ness of the body. To measure body-steadiness, an ataxi-
ameter was developed. The visual field was varied as
follows: 1) a full visual field provided by the fully lighted room, 2) a limited visual field provided by a luminous cube which surrounded the subject in a fully darkened room, 3) no visual field achieved by simply blind-folding the subject, and 4) an unstable visual field provided by rocking the luminous cube clockwise and coun-
ter clockwise around its horizontal axis in the darkened room. Thirty-six men and thirty-seven women from Brooklyn College were used in this investigation. It was found that as the visual field was weakened, eliminated, and made unstable, there occurred a progressive increase in body sway.

Further evaluation and analysis were investigated
by Dickinson and Leonard (1967) concerning the role of vision in static balancing. They classified 18 graduate and undergraduate students from the university between the age of 18 to 30 years old into three groups to be tested under sighted, blindfolded, and minimal cue condi-
tions. A beam of variable width was used for the exami-
nation. One of these groups was trained in the use of
peripheral vision and after five days achieved sighted competence under the minimal cues condition. A second group had no training, but practiced for a similar period and showed no such improvement. The third group was tested with progressively decreasing amounts of peripheral vision, and the stage at which deterioration in performance occurred was noted. These results seem to support the findings of Begbie (1966) who stated that peripheral vision is very important in maintenance of balance, and that any restriction of peripheral vision and corresponding decrease in information regarding body position is likely to cause an immediate decrease in ability to balance.

The previous studies have shown that both static and dynamic balance are aided greatly when visual cues are present; the finer the visual points of reference the better the balance performance.

**Touch**

The organs of touch are also extremely important to maintaining a balanced body position. In fact, many authorities assign to them the major role in controlling body sway (Edwards, 1946; Broer, 1973). The sensations in the soles of the feet are particularly important. It seems reasonable that the organs of touch are stimulated by the increased pressure on the balls of the feet, which is in turn caused by a forward swaying of the body.
During this motion, the end organs which produce kinesthetic sense, the extensor muscles of the ankles and muscles of the feet, are elongated.

**Kinesthetic (proprioceptors)**

The terms kinesthetic and proprioceptor generally refer to the same sense, which is responsible for providing information concerning the body's position in space and the relationship of its parts. Experimental psychologists usually refer to this sense as kinesthetic; physiologists prefer the term proprioceptive. A kinesthetic sense is believed to underlie many discriminating functions of the body which are required for successful motor skill performance, e.g. locomotion, perception of pressure changes, balance and body equilibrium, and over-all body coordination. Its presence is thought to contribute to an individual's ability to learn as well as to perform motor skills. (Dickinson, 1976)

When proprioceptors in the muscles, tendons, and joints are stimulated, the impulses pass through the posterior column of the spinal cord to the thalamus and finally to the somatic area of the cerebral cortex. If the posterior column is destroyed, the result is a loss of sensation in limb movement and position. Coordination of the visual, vestibular, and somatic sensory receptors contributes to the body's orientation in space. Without this information, adjustments leading to the maintenance
of balance would be impossible. The proprioceptors in the muscles, tendons, and joints of the feet and legs are important in helping to control body sway. (Broer, 1973)

Both of the senses of touch and kinesthetics could, therefore, be responsible for the information received by the brain, namely that the body is swaying forward, and that a backward adjustment is necessary to maintain balance. (Broer, 1973)

Techniques for Measuring Balance

Several techniques for measuring balance have been proposed. These measurements are divided into two categories: those involving static body balance and those measuring dynamic balance. The measurement of static balance has taken many forms. Travis (1945) and Miles (1950) used the ataxiameter to record body sway, while standing in the lateral and anteroposterior planes with the eyes open and eyes closed. The major function of the ataxiameter has been as a clinic test of equilibrium.

Fisher, Birren, and Leggett (1945) in an effort to standardize a static balance test used the ataxiagraph which represents a compromise between the highly quantitative results of the ataxiameter and the qualitative advantages of graphic recording. The technique consisted of recording the anterior-posterior movements of a person standing erect with heels together and feet spread in a 30° 'V' position. The subject wore a helmet from the top of which protruded a short rod, to which was fastened a
cord that ran over a pulley and translated the subject's movement into equivalent vertical movements of an ink-writer on a kymograph. Two test lengths have been used: a) an eight-minute test of four two-minute trials, with eyes alternately open and closed. b) a four-minute test of two, two-minute trials, with eyes alternately open and closed.

Leonard (1966) and Dickinson (1968) used a different approach for measuring static balance. A beam of variable width was chosen as the apparatus. Subjects were required to stand on the beam and maintain their balance for 60 seconds. The narrowest width of beam upon which this criterion was achieved was taken as the subject's score in static balance. Also, Holbrook (1953) and Keogh (1968) evaluated static balance by requiring children to stand for 10 seconds on one foot with their hands on their hips. The task was scored on a pass-fail basis.

Bass (1939) developed the stick balance test for static balance, which has been used in several studies. In this test, subjects balance as long as possible with the ball of the preferred foot transversely placed upon a 1x2x12 inch steel bar placed on the floor. The sum of three timed trials constitutes the criterion score for static balance.

DeOreo and Wade (1971) selected the balance board to test static balance for pre-school children on the basis of its reliability, objectivity and feasibility of administration to young children. The balance board
measured 12x12x1 inches on a piece of wood with two aluminum rockers attached on the bottom. The edges of the board had two copper plates attached and connected to the timing device. Balance was tested in both the lateral and anterior-posterior plane. Subjects were given six trials, three in the lateral plane and three in the anterior-posterior plane. The final score was the average of the six trials. Verbal instructions and demonstration preceded the timing. The test-retest reliabilities for the balance board was .86.

Various approaches have been used to measure dynamic balance. Bass (1939) devised a test of dynamic balance to use only with respect to those with vision. In this test subjects are required to maintain equilibrium during their performance. A composite score is developed of the subject's capacity to perform these tasks. Another test developed by Bass (1939) to measure dynamic balance was the stepping stone test. The pattern of this test consisted of ten circles painted on the floor with different distances between them. Subjects stood on the right foot in the starting circle, leaped onto the left foot into the first circle and continued leaping into the remaining circles on alternate feet. To obtain a high score, subjects had to: a) land within the circle; b) keep the weight on the landing foot only; c) keep the foot in contact with the floor; d) hold as steady a balance as possible up to, but not exceeding, five seconds. The final
score was dependent upon the holding time and the subject's errors.

Tests of dynamic balance involving the use of beams or rails have also been fairly common. Such a test was standardized by Fisher, Birren and Leggett (1945). A beam one inch wide and ten feet long was used. Subjects were required to walk the beam in a heel-toe fashion with the hands behind the back. Performance was measured by the distance covered in ten trials. The maximum score was 100 feet. The limitation of this test was that it failed to discriminate between those with perfect scores. An alternative test was devised by Graybiel and Fregly (1965). In this test six different rails were used, each eight feet long and varying in width from two and one-half inches to one-half inch long. Their test involved subjects walking along these rails in a heel-to-toe manner starting on the widest beam. The score was taken as the number of steps made before the subject could no longer maintain balance.

Travis (1944) produced an apparatus for the measurement of dynamic balance which he named a stabilometer. This consisted of a platform on a universal joint. Electronic counters measured deviation of the platform by more than two degrees from the horizontal. When the platform was in the horizontal position, a stylus was located on a target. The task of the subject was to maintain the stylus on target for a period of 60 seconds. A similar
test devised by Begbie (1966) used a rocking platform equivalent to one ellipse rolling on another. The subject's task was to keep the platform as steady as possible in a horizontal position for 60 seconds. The score in this case was the largest deviation between a right and left sway during the middle 40 seconds of the testing period.

DeOreo and Wade (1971) used three 12' beams to test dynamic balance for pre-school children. The beams measured 1 3/4x4, 1 3/4x3, 1 3/4x2 inches respectively. During the testing the selected beam was raised one foot off the ground. The beams were marked in 0.5 foot intervals to facilitate scoring. The test comprised of four tasks performed first on the four inch beam, then three inch beam, and finally the two inch beam. The four tasks were: 1) walk forward the length of the beam, 2) walk backward the length of the beam, 3) touch one knee to the beam and, 4) stoop, turn a complete turn, and stand. Verbal instructions and demonstration preceded the testing. Subjects were given three trials on each of the four tasks. The final score was the average of the three trials.

Bruininks (1978) developed a norm-referenced test (Bruininks-Oseretsky Test of Motor Proficiency) which included measures of dynamic and static balance. This test was designed to assess both gross and fine motor development. The test is appropriate for student ages four and
one-half to 14½ years and contains eight subtests. Balance was included as one of the subtest items. The following items measure static balance: 1) standing on preferred leg on floor, 2) standing on preferred leg on balance beam, and 3) standing on preferred leg on balance beam with eyes closed. The following items measure the dynamic balance: 4) walking forward on walking line, 5) walking forward on balance beam, 6) walking forward heel-to-toe on walking line, 7) walking forward heel-to-toe on balance beam, and 8) stepping over response speed stick on balance beam. The short form of Bruininks-Oseretsky Test was used successfully with hearing-impaired children. (Schmidt, 1981)

Research Related to Motor and Balance Skills of the Deaf Compared with Those of Hearing Children

A review of the available published literature reveals ten studies comparing motor and balance skills of the deaf with those of hearing children. The findings of these studies are not definitive enough to be the basis for considering longitudinal research or implementation of carefully controlled and evaluated pilot programs.

Studies conducted by Long (1932) and later followed by Morsh (1936) revealed that deaf children were equal to normal hearing children in manual or fine motor skills (eye-hand coordination tasks) and inferior to hearing children in balance skills as measured by the balance
beam (Long) and the Dunlap Balancing Board (Morsh). Long noted that deaf boys scored better than deaf girls in the balance skills. In these studies the deaf were grouped together and compared to the normal hearing.

Further investigations were conducted by Myklebust (1946) who classified 703 deaf students from the New Jersey School for the Deaf in five groups according to etiology: endogenous, presumably endogenous, exogenous, meningitis, and undetermined. Subjects were given the Heath Railwalking Test to measure locomotor coordination and balance ability. A summary of his work indicated that deaf children displayed inferior static balance skills as compared to hearing children and that the deaf, in general, had poorer dynamic balance. Myklebust also implied that boys demonstrated superior gross motor and balancing abilities compared to girls and that deaf meningitis children were significantly inferior in motor skills to all other etiological classifications of deaf children. He also hypothesized that the inferior motor performance by the meningitis group was due to the non-functioning semicircular canals rather than the loss of hearing.

Several investigators have analyzed the cause of hearing loss and its relationship to balance with deaf students. Padden (1959) studied the effect of submersion upon the sense of orientation in deaf swimmers. The results of his study indicated that deafness caused by
meningitis is usually accompanied by poor orientation or balance as measured by the ability to resurface after submersion.

Boyd (1967) compared the motor behavior of deaf and hearing boys using selected items of the Oseretsky and Van Der Lugt Psychomotor Test in the area of static balance, locomotor coordination, psychomotor integration, and laterality. The 90 deaf boys used as subjects from Canada and United States residential schools for the deaf were classified in three etiological groups of thirty boys each: a) pre- or paranatal and exogenous; b) hereditary (endogenous) and c) exogenous post-natally deaf. There were ten subjects who were within three months of the mid-year at ages eight, nine, and ten in each etiological group. The mean level of impairment ranged from 80 to 90 dB in the better ear, indicating that all subjects were severely impaired with no significant differences of hearing among the etiological groups. No subjects were included who had an additional handicapping condition. The control group consisted of hearing subjects matched according to age, sex, and IQ to the experimental group. There were ten subjects at each age level.

The Kruskal-Wallis one-factor analysis of variance was used to compute the differences between variances with respect to each area. The results indicated; 1) the deaf were significantly inferior at all three age levels (eight, nine, and ten years old) on static balance
performance; 2) there was a maturational effect on the locomotor coordination test indicating increasingly significant differences at the three age levels in favor of the hearing groups. The result of the studies clearly reveal the need for improved physical education programs and methodologies designed to enhance the motor abilities of deaf students. More specifically, the balance, equilibrium, and kinesthetic skills of the deaf are deficit areas of development.

Identifying specific remedial activities to improve the balance deficits of deaf children was recommended by Lindsey and O'Neal (1976). Their main attention was to compare the performance of 31 eight year old boys and girls, black and white, from two residential deaf schools in North Carolina with 65 dB or greater hearing loss with the performance of 77 hearing boys and girls, eight years old, black and white, from two public schools in North Carolina on a battery of 16 static and dynamic balance test. The test items were selected from previously published test batteries routinely used in the motor evaluation of children. They were divided into the two major classifications of dynamic balance and static balance skills. There were ten dynamic, and six static balance test items. The test was administered by an examiner and a recorder. When testing hearing-impaired students, an interpreter was used to insure complete understanding of each test.
All subjects were tested individually. The examiner and interpreter explained each activity and demonstrations were repeated, if necessary, to ensure that each child understood the task to be performed. The children were given three attempts to correctly accomplish each test. All children received positive reinforcement in praise of correct performance throughout the testing period. Data were analyzed using the analysis of variance technique to compare the deaf and hearing children on the balance tasks. The etiological classifications of the deaf were not included in this study, but the level of impairment, race, and sex were controlled.

Four major conclusions were reported: 1) deaf eight-year-old children demonstrated deficient abilities in static balance skills as compared to hearing eight-year-olds. This result confirms and strengthens the conclusion of previous research, 2) deaf eight-year-old children demonstrate deficient abilities in dynamic balance skills when compared to hearing eight-year-olds. This result is in agreement with Boyd's findings (1967) concerning locomotor coordination or dynamic balance skills of eight-year-olds, 3) there were no significant differences based on race or sex, in the performance of the grouped static and dynamic balance skills or of the individual test items for all the eight-year-olds, 4) lack of vision severely impaired the performance of the deaf more than the hearing children.
The investigators suggested that more studies are needed to identify specific remedial activities aimed at direct intervention with the individual motor and balance deficits of deaf children, and to determine which etiological groups of deaf children, if any, respond best, least, or not at all to such remedial intervention. Lindsey and O'Neal (1976) also stated that one variable not controlled in their study which may have influenced results, was the factor of educational placement; the hearing subjects were from public schools and the hearing-impaired subjects were from residential schools for the deaf.

Logan (1969) conducted a study using 60 hearing-impaired and 60 hearing subjects at elementary and college levels to compare static and dynamic equilibrium with two diverse age groups. The results indicated that hearing-impaired elementary children were significantly poorer than hearing children in performance on all six measures of static and dynamic balance. This finding is in agreement with most of the previous research. However, performances by college level hearing-impaired subjects were significantly poorer relative to hearing college subjects on only three of the six measures. She hypothesized that by college age some sort of compensatory skills were learned by the hearing-impaired.

The effect of visual cues and visual deprivation on a balance task was studied by Grimsley (1972). Sixty deaf students from each of two schools, the Eastern North
Carolina School for the Deaf and Springfield Middle School in North Carolina, were selected randomly to serve as subjects for this study. Of the sixty deaf subjects, thirty-nine were congenitally deaf, twelve were acquired deaf, and for nine the cause of deafness was unknown. Subjects ranged in age from twelve through fifteen years of age, and the study group was divided equally between males and females.

The results were reported as five major conclusions:
1) non-hearing-impaired individuals were superior to hearing-impaired individuals under conditions of normal cues, visual cues, and visual deprivation. 2) hearing-impaired individuals learn as significantly as non-hearing-impaired individuals on balance, 3) congenitally deaf individuals do not demonstrate more learning abilities than the acquired-deaf individuals on the three tests of balance, 4) visual deprivation significantly impairs balance performance of both non-hearing-impaired and hearing-impaired individuals, 5) visual cues significantly aid hearing-impaired populations on balance performance, but do not help non-hearing-impaired populations.

Grimsley's study leaves the investigator with two distinct impressions: 1) the importance of visual cues with deaf participants is emphasized. It is quite possible that we are not utilizing visual cues to their full advantage in our educational tasks. Certainly, total communication is the most basic visual cue; 2) the study also shows that hearing-impaired can learn a balance task
as well as non-hearing-impaired individuals which encourages additional experimental studies to ascertain what kind of programs or activities are most effective in improving the balance deficits.

In another study conducted by Geddes (1978), a group of eleven preschool age deaf and hard of hearing children enrolled at the John Tracy Clinic for preschool deaf children were evaluated on relevant portions of the Geddes Psychomotor Inventory. Data were taken from observations during free play, parent, and teacher reports. (The reason for the small number of children participating in this study was due to the small number of children available in the four to six years of age range, who were deaf or hard of hearing and who were permitted by parents to be tested.) Four boys and seven girls ranging in age from four years and zero months to five years and six months were used as subjects.

The results indicated that essentially all subjects functioned at age level in total motor development, but some performances were above age level in specific skills. Two subjects were lower in motor development than the remainder of the group and four subjects had poor performance on specific balance skills (two of them had had meningitis at an early age). This supported the rationale that there was a relationship between etiology of meningitis and specific balance difficulties.

In a recent study conducted by Schmidt (1981), 70 hearing-impaired students from within the Salem region of Oregon, (42 students from public school and 28 students
from the Oregon State School for the Deaf) were evaluated in motor proficiency as measured by the Bruininks-Oseretsky Test of Motor Proficiency (short form). The investigator attempted to discern the relationship of variables associated with hearing-impairment to motor proficiency. Subjects were classified according to seven variables: age, sex, level of hearing impairment, corrected level, age of onset, etiology, and educational placement.

Results were reported as four major findings: 1) no significant relationship existed between motor proficiency and level of hearing loss or corrected level, 2) age related significantly to the total point scores on the motor proficiency, 3) no differences in the mean total point scores between the hereditary and non-hereditary etiology groups or between the males and females were found, 4) a significant difference in total point scores between the OSSD day group and both the OSSD residential group and the public school group was observed in favor of the latter two groups. Schmidt concluded that there is no relationship between a hearing-impairment and motor proficiency. Only two variables (age and educational placement) out of the seven variables were found to be significant factors associated with hearing-impairment and motor proficiency.

Schmidt's study revealed the importance of knowing what characteristics affect or do not affect motor
performance for program planning with the hearing-impaired population.

Berges (1969) listed certain physical characteristics related to motor ability which the deaf may exhibit. Although this article is not considered a research study, it contains information that would be helpful for any physical educator working with hearing-impaired students. Regarding the motor characteristics of the deaf, Berges (1969) stated:

His balance may be poorer and his lung capacity may be underdeveloped due to decreased breathing because of lack of speech. He may show somewhat superior hand steadiness and control. (p. 69)

One of the strongest comments made by Berges (1969) was that:

Some deaf persons may experience dizziness and have poor balance. Therefore, during stunts, tumbling, and apparatus units, their participation may be limited. (p. 70)

Also, he suggested activities which improve body balance, coordination, and control should be stressed for the deaf student in any physical education program.

Wisher (1969) emphasized the importance of movement, especially dance, as an important aspect of communication. He encouraged deaf persons to transfer abstractions into dance movements. Thus, a story, poem or song can be danced, if one uses this method. Wisher reported that the deaf will demonstrate poor balance skills if the deafness is associated with the vestibular portion of the inner ear. Also, the particular causes of deafness may
affect balance. A pupil becoming deaf from spinal meningitis may have poorer balance than a pupil born deaf (Wisher, 1969). However, poor balance, in the sense of total body response, has not been a problem as observed by Wisher with the dancers enrolled at Galludet. This observation should be interpreted with caution, because the individuals observed were all college students and may not be a true representation of the total deaf population.

Pennella (1979) observed that deaf persons will have balance problems if there is damage to the semicircular canal or if the etiology is meningitis. This has implications for physical education curricula especially in schools which educate the deaf. He also recommended that further research be conducted utilizing more control for etiology to ascertain what kind of programs or activities are most effective in eliminating or improving the known balance deficits. Pennella suggested that special attention is needed for deaf children regarding their balance problems, and implementation of specific programs of balance activities would be helpful.

Summary

Based on the review of related research, the following observations are warranted:

1. The dynamic components of equilibrium, characterized as an orientation, perceptual-motor
adjustment of the body while in motion in relation to gravity are unrelated to the static components characterized as a continuous tonic reaction in maintaining fixed positions of the body in relation to gravity. (Travis, 1945)

2. Four sensory organs contribute to the maintenance of body equilibrium: inner ear (semi-circular canals), vision, touch, and the end organs of the kinesthetic sense (the proprioceptors in muscles, tendons, and joints). (Heath, 1944)

3. A causal relationship between maintaining equilibrium and senses, other than hearing, exists. Therefore, an instructional program of balance activities utilizing vision, kinesthetic and tactile sensation will likely be effective in improving balance. (Padden, 1959)

4. Visual cues significantly aid hearing-impaired population on balance performance, but do not help non-hearing-impaired population. (Grimsley, 1972)

5. The hearing-impaired children, in general, display significantly poorer static and/or dynamic balance than do non-hearing-impaired children. Furthermore, the hearing-impaired children who had meningitis were significantly inferior in balance skills to all other etiological classifications of deaf children, due to the dysfunction
of the semicircular canals. (Myklebust, 1946; Geddes, 1978)

6. Recommendations have been raised by Boyd (1967), Berges (1969), Case (1973), Lindsey and O'Neal (1976), and Pennella (1979) in regard to the kinds of programs or activities which may be effective in eliminating or improving the known balance deficits.

In conclusion, research to study the effect of curricula designed to improve the balance of hearing-impaired children has not been conducted. There is a critical necessity to conduct research to determine the effect of such programs on the improvement of balance with hearing-impaired children.
CHAPTER III

METHODS AND PROCEDURES

The primary purpose of the present study was to determine if an eight-week instructional program could significantly affect the acquisition and improvement of balance performance among hearing-impaired children, ages 6-12. The study was conducted with hearing-impaired students from the Oregon State School for the Deaf. In this chapter, the methods and procedures used in the study are presented in the following sections: selection of subjects, selection of instruments, instructional balance program (treatment), design of the study, and statistical analysis.

Selection of Subjects

The subjects used in the study were 34 hearing-impaired children from the Oregon State School for the Deaf in Salem, Oregon. The age range was between six and twelve years old. There were seven girls and ten boys in the experimental group, five girls and twelve boys in the control group. Each group had the same number of children in each age cell (see Table I). The subjects were randomly assigned to the respective groups using the table of random numbers. The small sample size was due to the relatively small numbers of children available between the ages of six and 12 years old, (total of
40 students) who were deaf or hard of hearing and enrolled as regular students at the Oregon State School for the Deaf. The study population of 34 was comprised of all the eligible residents at the Oregon State School for the Deaf, who were between ages six and twelve. Six subjects were eliminated from the study because the school records showed they possessed additional mental, physical, or emotional handicaps.

**TABLE I**

**DESCRIPTION OF THE STUDY POPULATION FOR EXPERIMENTAL AND CONTROL GROUPS**

<table>
<thead>
<tr>
<th>Age</th>
<th>Experimental Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>6-7</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>7-8</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>8-9</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>9-10</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>10-11</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>11-12</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>7</td>
</tr>
</tbody>
</table>

N=34
In regard to the degree of hearing loss, there were two boys and one girl who had severe hearing loss, and eight boys and six girls who had profound hearing loss in the experimental group. The control group had one boy and one girl with severe hearing loss. No one was reported as having a hearing loss less than severe. This indicates that the majority of the subjects, both in the experimental and control groups, fell into the profound hearing loss category. (See Table II.)

TABLE II
SEX BY DEGREE OF HEARING LOSS FOR THE EXPERIMENTAL AND CONTROL GROUPS

<table>
<thead>
<tr>
<th>Degree of Hearing Loss (BEA)</th>
<th>Experimental Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Severe (71-90 dB)</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Profound (91 dB)</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>N=17</td>
<td></td>
</tr>
</tbody>
</table>

With reference to etiology, and according to the medical records from Oregon State School for the Deaf, Table III gives the number and percentages of students reporting various causes of hearing-impairment. As indicated, 8.83% was due to maternal rubella, 14.71% to heredity, 2.94% to
prematurity, 17.65% to meningitis, 8.83% to high fever, 5.88% to measles and 41.18% reported the cause not determined or as unknown. The most frequently reported cause of hearing-impairment after the unknown cause was meningitis (17.65%), which is associated with profound loss (hearing level exceeded 90 dB) during the first two years of the child's life.

### TABLE III

**NUMBER AND PERCENTAGE OF REPORTED CAUSES OF HEARING IMPAIRMENT IN BOTH THE EXPERIMENTAL AND CONTROL GROUPS**

<table>
<thead>
<tr>
<th>REPORTED CAUSES</th>
<th>Experimental Group</th>
<th>Control Group</th>
<th>Both Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>% of</td>
<td>N</td>
</tr>
<tr>
<td>Maternal Rubella</td>
<td>2</td>
<td>11.76</td>
<td>1</td>
</tr>
<tr>
<td>Heredity</td>
<td>2</td>
<td>11.76</td>
<td>3</td>
</tr>
<tr>
<td>Prematurity</td>
<td>1</td>
<td>5.88</td>
<td>-</td>
</tr>
<tr>
<td>Meningitis</td>
<td>6</td>
<td>35.29</td>
<td>-</td>
</tr>
<tr>
<td>High Fever</td>
<td>3</td>
<td>17.65</td>
<td>-</td>
</tr>
<tr>
<td>Measles</td>
<td>-</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Unknown Causes</td>
<td>3</td>
<td>17.65</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td></td>
<td>17</td>
</tr>
</tbody>
</table>
Selection of Instrument

The Bruininks-Oseretsky Test of Motor Proficiency (Subtest 2: Balance) was used as the criterion instrument to measure balance skill for both the pre-test and the post-test. This instrument was selected on the basis of its reported validity, reliability, objectivity, and administrative feasibility. A description of the test items is presented as follows:

1. **Standing on Preferred Leg on Floor.** This item measures the ability of static balance by having the subject stand on the preferred leg on a line, and with the other leg bent so that it is parallel to the floor. The subject must maintain the position for ten seconds to achieve a maximum score.

2. **Standing on Preferred Leg on Balance Beam.** This item measures the ability of static balance by having the subject stand on the preferred leg on the balance beam, looking at the target, with hands on hips, and with other leg bent so that it is parallel to the floor. The subject must maintain the position for ten seconds to achieve a maximum score.

3. **Standing on Preferred Leg on Balance Beam - Eyes Closed.** This item measures the ability of static balance by having the subject stand on the preferred leg on the balance beam with eyes closed,
hands on hips, and with other leg bent so that it is parallel to the floor. The subject must maintain the position for ten seconds to achieve a maximum score.

4. **Walking Forward on Walking Line.** This item measures the ability of dynamic balance by having the subject walk forward on the walking line in a normal walking stride with hands on hips. The subject must walk forward six steps to achieve a maximum score.

5. **Walking Forward on Balance Beam.** This item measures the ability of dynamic balance by having the subject walk forward on the balance beam in a normal walking stride with hands on hips. The subject must walk forward six steps to achieve a maximum score.

6. **Walking Forward Heel-to-Toe on Walking Line.** This item measures the ability of dynamic balance by having the subject walk forward on the walking line heel-to-toe, with hands on hips. The subject must make six consecutive steps correctly to achieve a maximum score.

7. **Walking Forward Heel-to-Toe on Balance Beam.** This item measures the ability of dynamic balance by having the subject walk forward on the balance beam heel-to-toe, with hands on hips. The subject must make six consecutive steps correctly to achieve a maximum score.
8. Stepping Over Response Speed Stick on Balance Beam. This item measures dynamic balance by having the subject walk forward on the balance beam stepping over the response speed stick held at the middle of the beam by the examiner. The subject walks in a normal walking stride with hands on hips. The score is recorded as pass or a fail.

Careful planning was undertaken for the administration of the test, which was conducted in an area that was relatively free from noise or other distractions. Sufficient space was available. Approximately 15 to 20 minutes were needed to individually administer the test items for each subject. The test was administered for both the pre- and post-tests using total communication with the assistance of a certified interpreter. In Appendix (C) the test directions and a copy of the individual record form is found.

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3 Total communication is a theory of communication that stresses the right of the teacher and the deaf child to use all available forms of communication to develop a bank of concepts and language. In the classroom, these forms may include child devised gestures, amplification, speech, lipreading, finger spelling, formal sign language, and reading or writing. Proponents of this point of view maintain that, since it insures meaningful two-way communication at all times, total communication provides the best learning situation for a hearing-impaired individual to develop to his maximum potential. (Katz, p. 39, 1978)
Instructional Balance Program
(Treatment)

A review of literature revealed that no attempt has been made to indicate the type of physical activities most effective in improving the balance of hearing-impaired children. Lindsey and O'Neal (1976), Pennella (1979), Berges (1969), and Case (1973) suggested further research to meet the special needs of deaf children regarding their balance problems, and to consider the implementation of specific programs of kinesthetic, balance, and equilibrium activities. The eight-week instructional balance program designed for this study was implemented to determine if there is any significant difference in the achievement of the performance of dynamic and static balance skill, by comparing the scores of the experimental group with the scores of the control group.

This treatment was based on the following assumptions: 1) there is a need for balance training to compensate for the dysfunction of the semicircular canal common with the deaf population; 2) if there is a causal relationship between maintaining equilibrium and senses other than hearing, then an instructional program focused on balance activities, utilizing vision, kinesthetic and touch organs, will likely be effective in improving balance; 3) the deaf population can learn a balance task as well as the hearing population, and the rate of learning is not affected by either age or sex. (Drowatzky, 1975)
The control group was given the pre- and post-test. Subjects in the control group participated in the Deaf School's physical education curriculum and playground activities without any particular emphasis on balance skills. The activities they participated in during the eight-week period included softball, swimming, badminton, and basketball. Instruction was provided for 30 minutes daily by a physical education teacher employed by Oregon State School for the Deaf. The instructional methodology focused on lead up games with an emphasis on team experiences. The class size was approximately eighteen students.

The experimental group was given the treatment for eight-weeks, from April 12th to June 3rd, of the 1982 school year. The experimental group was divided into two instructional classes. Seven students between ages six and nine years old were placed in the first class. Ten students between ages nine and twelve years old were placed in the second class. Each class received four 30-minute instructional sessions per week, for a total of 960 minutes. Gravlee (1965) found that motor skill performance could be improved after as little as 480 minutes of movement exploration training.

The program was based on the learning theory of Skinner (1965), called operant conditioning or reinforcement theory. In this learning approach, the learner is led through a sequence of specially designed behaviors arranged to increase the probability that the desired
behavior will occur. The concept of programmed instruction reflects an ordered sequence of small steps (stimuli), each requiring a response by the learner, which is then reinforced. The stimulus-response-reinforcement pattern continues until the material is learned. The learner is not allowed to learn more difficult material until he or she has mastered the prerequisite steps. This instructional method has been found effective in teaching severely handicapped youngsters basic motor skills. (Dunn et al., 1980)

The selection of appropriate learning tasks to form the lesson plan was carried out using the following process:

1. A pool of learning tasks were selected. These tasks were arranged from those perceived to be easy to tasks considered to be difficult.
2. A pilot study was conducted by having eight deaf students attempt each task.
3. A task evaluation and baseline sheet (Appendix D) was developed.
4. The performance of the eight students was graded according to the following criteria:\(^4\) a) too easy (X), b) challenging (✓), c) too difficult (0).

\(^4\)a) Too easy (X) - given to those tasks which the students performed with no effort; b) Challenging (✓) - given to those tasks which the students performed with an acceptable effort; c) Too difficult (0) - given to those tasks which the students could not perform.
5. Tasks were then eliminated from the pool, if they were either too easy or too difficult. The challenging tasks served as the foundation for the performance and enabling objectives. The main goal of this pilot study was to pinpoint specifically what phases and steps within each task the student could or could not perform. Thus, an accurate decision concerning the task and the phases necessary to begin teaching could be determined.

The program was conducted on an individualized basis. All task performance objectives were broken down into small, discreet steps (enabling objectives), and were carefully organized into a logical sequence. Each step was built deliberately upon the preceding one. Students could progress through the sequence of steps at their own rate and they were reinforced immediately after each successful step. The reinforcement technique utilized included pairing social praise with a tangible reinforcer. By using this procedure, the investigator believed that the wide range of individual needs among the experimental group population would be met.

The balance program (treatment) represented a teaching unit divided into thirty-two sub-units (lessons) over an eight-week period. The experimental group received a new lesson each day which included two tasks. Every task introduced to the students included a performance
objective, pre-requisite skills, and enabling objectives (Appendix E). The static sub-units were introduced on Mondays and Tuesdays, and the dynamic sub-units were introduced on Wednesdays and Thursdays of each week, to give an equal time of practice for both independent variables. Each week a new piece of equipment was introduced e.g. a straight line made by a tape, benches, bean-bags, mini-trampolines, tumbling mats, spring-boards, and beams. This was done to maintain the interest of the students. (See Table IV.)

This program contained a variety of activities and tasks with a major objective focused on balance performance. The selection of these activities was based on previous research studies and the investigator's background and experience. All of the activities and tasks were introduced to the students through a certified interpreter, and with visual demonstrations (slide programs and instructor's demonstrations) to insure the students understood the specific task at hand.

Progression was the most important principle in this treatment. In static balance tasks, the held position was gradually increased by balancing for five, ten and 15 seconds without undue movement or loss of balance. Also, the students performed the task with eyes closed after accomplishing it first with the eyes open. Students graduated to the higher beam as soon as the activities progressed from a line on the floor to a wide bench
and eventually included balance beams with different heights. Within each task, students were required to master the enabling objective sequentially before advancing to a new task.

**TABLE IV**

**EIGHT-WEEK PLAN FOR BALANCE UNIT**

<table>
<thead>
<tr>
<th>WEEK</th>
<th>MONDAY</th>
<th>TUESDAY</th>
<th>WEDNESDAY</th>
<th>THURSDAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Week</td>
<td>Static Straight Line (Tape) 1</td>
<td>Static Straight Line (Tape) 2</td>
<td>Dynamic Straight Line (Tape) 3</td>
<td>Dynamic Straight Line (Tape) 4</td>
</tr>
<tr>
<td>4/12 - 4/15</td>
<td>1982</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second Week</td>
<td>Static Bench 5</td>
<td>Static Bench 6</td>
<td>Dynamic Bench 7</td>
<td>Dynamic Bench 8</td>
</tr>
<tr>
<td>4/19 - 4/22</td>
<td>1982</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Third Week</td>
<td>Static Bean Bag 9</td>
<td>Static Bean Bag 10</td>
<td>Dynamic Mini-Trampoline 11</td>
<td>Dynamic Mini-Trampoline 12</td>
</tr>
<tr>
<td>4/26 - 4/29</td>
<td>1982</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fourth Week</td>
<td>Static Straight Line (Tape) 13</td>
<td>Static Straight Line (Tape) 14</td>
<td>Dynamic Straight Line (Tape) 15</td>
<td>Dynamic Straight Line (Tape) 16</td>
</tr>
<tr>
<td>5/3 - 5/6</td>
<td>1982</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fifth Week</td>
<td>Static Mat 17</td>
<td>Static Mat 18</td>
<td>Dynamic Bean Bag 19</td>
<td>Dynamic Bean Bag 20</td>
</tr>
<tr>
<td>5/10 - 5/13</td>
<td>1982</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sixth Week</td>
<td>Static Mat 21</td>
<td>Static Mat 22</td>
<td>Dynamic Spring Board 23</td>
<td>Dynamic Spring Board 24</td>
</tr>
<tr>
<td>5/17 - 5/20</td>
<td>1982</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seventh Week</td>
<td>Static Low Beam 25</td>
<td>Static Low Beam 26</td>
<td>Dynamic Low Beam 27</td>
<td>Dynamic Low Beam 28</td>
</tr>
<tr>
<td>5/24 - 5/27</td>
<td>1982</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eighth Week</td>
<td>Static High Beam 29</td>
<td>Static High Beam 30</td>
<td>Dynamic High Beam 31</td>
<td>Dynamic Slanted Beam 32</td>
</tr>
<tr>
<td>5/31 - 6/3</td>
<td>1982</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In order to record the students' progress, a daily class performance scoring sheet was developed (Appendix F). This form included the students' names, the performance objectives (tasks), and the enabling objectives (phases and steps). The criteria used in this evaluation were: 1) achieved (X), and 2) not achieved (0). Two performance objectives (tasks) were introduced daily in each lesson. Each task was broken into three to four enabling objectives (steps). All the steps were introduced to the students in a sequenced manner. Also, a weekly individual scoring sheet was designed. It contained information about the week number, student's name, and the time period (Appendix G). Four lessons were included in every week. Each lesson had two performance objectives (steps or phases). The same criteria used in the daily class sheet were also used here. The goal of this weekly individual evaluation sheet was to give the investigator an updated and complete report of the student's improvement with regard to the experiment's effect.

**Design of the Study**

The procedures utilized in this study included:

1. Administration of the pre-test to experimental

---

Achieved (X) - given to the student who performed the objective at the required level of competence; Not Achieved (0) - given to the student who failed to perform the objective at the required level of competence.
and control groups using the Bruininks-Oseretsky Test of Motor Proficiency (Subtest 2: Balance).

2. Administration of the treatment (instructional balance program activities) for an eight-week period for the experimental group only.

3. Administration of the post-test to the experimental and control group using the same test items as pre-test.

TABLE V
DESIGN MATRIX

<table>
<thead>
<tr>
<th>Students</th>
<th>Bruininks-Oseretsky Test (Subtest 2: Balance)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-Test</td>
</tr>
<tr>
<td>Experimental Group</td>
<td>n=17</td>
</tr>
<tr>
<td>Control Group</td>
<td>n=17</td>
</tr>
</tbody>
</table>

The area used for testing in both the pre- and post-test was suggested by the director of the Oregon State
School for the Deaf. It was an empty room in the preschool building, which met the space requirements suggested by the instruction manual of the Bruininks-Oseretsky Test. The room was free from any distractions. The test equipment was included in the Bruininks-Oseretsky Test kit provided by the Department of Physical Education, Oregon State University, Corvallis, Oregon.

All tests were given to each subject individually. Test instructions were presented orally and with demonstration from the investigator. A slide program was also used to insure that the subjects understood the specific tasks. The test procedure followed the manner suggested in the test manual. A certified interpreter was used to assist in the communication process. Every opportunity was taken to assure that the young, severely and profoundly impaired subjects understood the task they were expected to perform. Students were tested in the clothes that they wore to school.

The eight items which comprise the balance test were given in the following order: standing on preferred leg on floor, standing on preferred leg on balance beam, standing on preferred leg on balance beam - eyes closed, walking forward on walking line, walking forward on balance beam, walking forward heel-to-toe on walking line, and walking forward heel-to-toe on balance beam. Total testing time for completing all test items was approximately 15 to 20 minutes for one student. Subjects were tested
during the Spring Term of 1982.

Statistical Analysis

The basic statistical tool utilized for this study was the one-way analysis of covariance using the F statistic. Courtney (1983) described the analysis of covariance as a statistical technique which combines the concepts of analysis of variance and regression to handle situations where the researcher cannot completely control all of the variables in the study. It is a procedure for testing the significance of differences among means, accounting for the influence of uncontrolled factors in the experiment. The analysis of covariance adjusts the means for uncontrolled factors using regression analysis procedures. By making these adjustments, sampling error is reduced and precision is increased.

This statistical method was utilized to determine if any significant difference existed between experimental and control groups with respect to static and dynamic balance scores. The pre-test served as the covariant and was used as the reference for comparison to the post-test.
TABLE VI
ANALYSIS OF COVARIANCE

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>Adjusted df</th>
<th>Adjusted SS</th>
<th>Adjusted MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>1</td>
<td>A</td>
<td>A/1</td>
<td>MS\text{Bet}/MS\text{Wth}</td>
</tr>
<tr>
<td>Within (Error)</td>
<td>31</td>
<td>B</td>
<td>B/31</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>32</td>
<td>C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hypotheses

The hypotheses tested included:

1. There is no significant difference between experimental and control groups in the static balance scores after an eight-week instructional program.

\[ H_0 : M_1 = M_2 \]

2. There is no significant difference between experimental and control groups in the dynamic balance scores after an eight-week instructional program.

\[ H_0 : M_1 = M_2 \]

3. There is no significant difference between experimental and control groups in the total balance scores after an eight-week instructional program.
program.

\[ H_0: \ M_1 = M_2 \]

The .05 level of confidence was used to test the hypotheses of this study. The power level of the statistical test was .80. The effect size was .35, for a sample size of greater than 33 subjects. (Cohen, 1976)
CHAPTER IV

ANALYSIS AND DISCUSSION OF THE FINDINGS

The purpose of this study was to investigate the effect of an eight-week instructional program upon the improvement of balance performance, (static and dynamic), among hearing-impaired children. Thirty-four hearing-impaired students form the Oregon State School for the Deaf served as subjects in this study. Seven females and ten males were in the experimental group; five females and twelve males comprised the control group. Subjects in the experimental group were exposed to eight-weeks of balance program activities for four 30-minute instructional sessions per week. The control group participated in the Deaf School's physical education curriculum without any special emphasis on balance activities. The Bruininks-Oseretsky Test of Motor Proficiency (Subtest 2: Balance) was used as the criterion instrument to measure balance skills. Both pre-test and post-test data were subjected to statistical analysis to determine if there were any significant differences in the balance performance as a result of such a program.

The one-way analysis of covariance (ANCOVA) was utilized to test the null hypotheses. The pre-test served as the covariant of the study.
Findings

A comparison between experimental and control group mean scores on pre- and post-test for static balance is presented in Table VII.

TABLE VII
PRE- AND POST-TEST MEANS AND MEAN DIFFERENCES FOR STATIC BALANCE

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-test Mean</th>
<th>Post-test mean</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>7.53</td>
<td>9.65</td>
<td>+2.12</td>
</tr>
<tr>
<td>Group</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Group</td>
<td>7.76</td>
<td>7.76</td>
<td>+0.00</td>
</tr>
</tbody>
</table>

The experimental group experienced an increase in mean static balance performance over the control group from the pre- to the post-test (after eight-weeks instructional program), with a mean difference of +2.12. Table VIII presents the results of the analysis of covariance, which tested the significance of the difference between these two groups.
### TABLE VIII

**ANALYSIS OF COVARIANCE OF THE DIFFERENCE BETWEEN PRE- AND POST-TEST FOR STATIC BALANCE**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Adjusted df</th>
<th>Sum of Squares</th>
<th>Mean Squares</th>
<th>F</th>
<th>Level of Significance (P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Group (Treatment)</td>
<td>1</td>
<td>34.152</td>
<td>34.152</td>
<td>3.592</td>
<td>.067</td>
</tr>
<tr>
<td>Within Group (Error)</td>
<td>31</td>
<td>294.764</td>
<td>9.509</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>328.916</td>
<td>43.661</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F must be ≥ 4.22 for .05 level of significance.

The obtained F indicated no significant difference between the adjusted experimental and control group scores on static balance at the .05 level of significance. The first null hypothesis that there is no significant difference between experimental and control groups in the static balance scores after an eight-week instructional program was retained.

The obtained F indicated however, that there was a significant difference at the .067 level of significance. Further analyses were conducted to determine if the
contradiction in this finding was due to inequality in the regression slopes \(^6\) (Fig 3). Equality of regression slopes is considered to be one of the assumptions underlying the analysis of covariance (Griffey, 1982). Therefore, comparing the two groups (Experimental and Control) by analyzing their respective regression lines was necessary. In order to test for a common slope for both groups, the following full model and null hypothesis were used:

\[
\begin{align*}
\text{Group 1 (Experimental)} & : \quad \text{Static 2 (post)} - 9.7876 + 0.3445 \text{ (static pre)} \\
\text{Group 2 (Control)} & : \quad \text{Static 2 (post)} - 7.6479 + 0.9928 \text{ (static pre)}
\end{align*}
\]

and

\[
\begin{align*}
H_0 & = \text{Common slope} \\
H_a & = \text{Different slope}
\end{align*}
\]

The results indicated that the F ratio was significant at the .05 level of significance, which led to the rejection of the null hypothesis. It was concluded therefore, that the slopes are different and the assumption of equality of regression slopes did not meet the requirement for the analysis of covariance.

Further analysis to determine if there was overlapping of the confidence band \(^7\) was also needed. Figure 4 shows that the confidence band did not overlap from scores zero to six, but shows a great amount of overlapping between scores six to 17 on the pre-test scale. This led to the

\(^6\)Slope is the rate of increasing or degree of the line slanting.

\(^7\)Confidence band should be \(<95\%\) for the significant level .05. (Potthoff, 1964)
FIGURE 3. Regression Lines for Experimental and Control Groups on Pre- and Post-Test Score for Static Balance.
FIGURE 4. Regression Lines and 95% Confidence Bands Describe the Linear Relationship for Experimental and Control Groups Between Pre- and Post-Static Scores.
following conclusions: 1) for the students who scored six or less on the pre-test of static balance, there is a significant difference between regression lines for experimental and control groups, 2) for the students who scored greater than six on the pre-test of static balance, there is no significant difference between regression lines for experimental and control groups. This indicates that the improvement from scores zero to six, is due to the treatment effect. The experimental group students whose scores were higher than six, apparently did not improve to the same degree.

Table IX presents a comparison between experimental and control group mean scores on pre- and post-test for the second independent variable dynamic balance.

TABLE IX
PRE- AND POST-TEST MEANS AND MEAN DIFFERENCES FOR DYNAMIC BALANCE

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-test</th>
<th>Post-test (after 8 weeks)</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental Group</td>
<td>8.23</td>
<td>12.29</td>
<td>+ 4.06</td>
</tr>
<tr>
<td>Control Group</td>
<td>9.52</td>
<td>10.23</td>
<td>+ 0.71</td>
</tr>
</tbody>
</table>
Both experimental and control groups realized an increase in mean dynamic balance performance, but the experimental group showed a statistically significant increase over the control group during the eight-week instructional program, with a difference of +4.06 for the experimental group versus +0.71 for the control group. Table X presents the results of an analysis of covariance, which tested the difference for significance between these two groups.

**TABLE X**

**ANALYSIS OF COVARIANCE OF THE DIFFERENCE BETWEEN PRE- AND POST-TEST FOR DYNAMIC BALANCE**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Adjusted df</th>
<th>Sum of Squares</th>
<th>Mean Squares</th>
<th>F</th>
<th>Level of Significance (P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Group (Treatment)</td>
<td>1</td>
<td>77.544</td>
<td>77.544</td>
<td>16.079</td>
<td>.001</td>
</tr>
<tr>
<td>Within Group (Error)</td>
<td>31</td>
<td>149.507</td>
<td>4.823</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>227.051</td>
<td>82.367</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F must be $\geq 7.82$ for .001 level of significance.

The obtained $F$ indicated a significant difference between the increases in dynamic scores of experimental and control groups at the .001 level of significance.
The second null hypothesis that there is no significant difference between experimental and control groups in the dynamic balance scores after an eight-week instructional program, was rejected.

To test the equality of regression slopes for the dynamic balance scores the following full model was used:

Group 1 (Experimental) \[ \text{Dynamic 2 (post)} = 6.45 + .71 \text{ (dynamic pre)} \]
Group 2 (Control) \[ \text{Dynamic 2 (post)} = 2.33 + .83 \text{ (dynamic pre)} \]

The result of this analysis confirms that the regression slopes were equal and the regression lines for experimental and control groups on pre- and post-test scores of dynamic balance were parallel (Fig. 5). This finding confirmed that there is a significant difference between pre- and post-test scores at the .001 level of significance.

For the combined balance, static and dynamic scores, Table XI presents a comparison between the experimental and control groups mean score on pre- and post-tests.

<table>
<thead>
<tr>
<th>TABLE XI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PRE- AND POST-TEST MEANS AND MEAN DIFFERENCES FOR TOTAL BALANCE</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-test</th>
<th>Post-test (after 8 weeks)</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Experimental Group</strong></td>
<td>15.76</td>
<td>21.94</td>
<td>+ 6.18</td>
</tr>
<tr>
<td><strong>Control Group</strong></td>
<td>17.29</td>
<td>18.00</td>
<td>+ 0.71</td>
</tr>
</tbody>
</table>
FIGURE 5. Regression Lines and 95% Confidence Band Describe the Linear Relationship for Experimental and Control Groups Between Pre- and Post-Dynamic Scores.
The experimental group experienced an increase in mean total balance performance from the pre- to the post-test with a mean difference of +6.18. The control group experienced a slight increase in total balance score from the pre- to the post-test with a mean difference of +0.71. Table XII presents the results of an analysis of covariance which tested the difference for significance in total balance scores between these two groups.

**TABLE XII**

**ANALYSIS OF COVARIANCE OF THE DIFFERENCE BETWEEN PRE- AND POST-TEST FOR THE TOTAL BALANCE**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Squares</th>
<th>F</th>
<th>Level of Significance (P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Group (Treatment)</td>
<td>1</td>
<td>211.902</td>
<td>211.902</td>
<td>12.182</td>
<td>.001</td>
</tr>
<tr>
<td>Within Group (Error)</td>
<td>31</td>
<td>540.113</td>
<td>17.423</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>752.016</td>
<td>229.325</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F must be $\geq 7.82$ for .001 level of significance.

The obtained F indicated a significant difference between the increase in total balance scores, (static and
dynamic) of the experimental and control groups at the .001 level of significance. The third null hypothesis that there is no significant difference between experimental and control groups in the total balance scores after an eight-week instructional program was rejected.

To test the equality of regression slopes for total balance scores the following full model was used:

Group 1 (Experimental) Total Balance 2 (Post) = 13.4053 + .541456 (Total Pre)
Group 2 (Control) Total Balance 2 (Post) = 1.3943 + .960191 (Total Pre)

The results indicated that the slopes were different, and the assumption of equality of regression slopes did not meet the requirement for analysis of covariance (Fig. 6).

Further analysis to determine if there was overlapping of the confidence band was also conducted. Figure 7 shows that confidence band did not overlap from scores zero to 19, but reflects a great amount of overlapping between scores 19 to 35 on the pre-test scale. This led to the following conclusions: 1) for the students who scored 19 or less on the pre-test of total balance, there is a significant difference between regression lines for experimental and control groups, 2) for the students who scored greater than 19 on the pre-test of total balance, there is no significant difference between regression lines for experimental and control groups. This indicates that the improvement from scores zero to 19, was due to the treatment effect. The experimental group
FIGURE 6. Regression lines for Experimental and Control Groups on pre- and post-test score for Total Balance.
FIGURE 7. Regression Lines and 95% Confidence Bands Describe the Linear Relationship for Experimental and Control Groups Between Pre- and Post- Total Balance.
students whose scores were higher than 19 on the pre-test, apparently did not improve to the same degree.

Summary of Findings and Discussion

The first null hypothesis that there is no significant difference between experimental and control groups in the static balance scores after an eight-week instructional program was retained at .05 level of significance on the basis of the obtained F statistic. However, the F value indicated that there was a significant difference at the .067 level of significance. On the basis of the obtained F further analyses were conducted by examining the equality of regression slopes and overlapping of the confidence bands. The results of this analysis indicated a significant difference between regression lines of experimental and control groups for students who scored six or less on the pre-test of static balance. This inferred that the improvement showed from zero to six scores was due to the treatment effect. Experimental group students whose scores were higher than six did not improve in static balance to the same degree. Some possible contributing factors were: a) the nature of the tasks used to enhance static balance were not exciting or attractive to the experimental students because they normally required holding specific positions for a period of time, b) an eight-week period may have been too short for
the experimental students to increase their static balance skills.

The difference in mean static balance scores between pre- and post-test for the experimental and control groups is found in Table XIII and Figure 8. After an eight-week instructional balance program, an increase of 2.12 between the pre- and post-mean scores was found in favor of the static balance performance of the experimental group over the control group.

**TABLE XIII**

MEAN AND STANDARD DEVIATION OF THE PRE- AND POST-TEST SCORES FOR THE STATIC BALANCE VARIABLE

<table>
<thead>
<tr>
<th>Variable</th>
<th>Experimental N=17</th>
<th>Control N=17</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
</tr>
<tr>
<td>( \bar{X} )</td>
<td>7.52</td>
<td>9.64</td>
</tr>
<tr>
<td>( S )</td>
<td>4.78</td>
<td>3.83</td>
</tr>
</tbody>
</table>
FIGURE 8. Mean Static Balance Scores of Pre- and Post-Test (Experimental and Control Groups).
The second null hypothesis, that there is no significant difference between experimental and control groups in the dynamic balance scores after an eight-week instructional program was rejected on the basis of the obtained F statistic at the .001 level of significance. Examination of the equality of regression slopes confirms the previous conclusion of analysis of covariance (rejecting the null hypothesis at the .001 level of significance). In Table XIV and Figure 9, mean dynamic balance scores for both the pre- and post-tests for the experimental and control groups are illustrated. After an eight-week instructional balance program, an increase of 4.06 between pre- and post-mean scores were found.

<table>
<thead>
<tr>
<th>TABLE XIV</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEAN AND STANDARD DEVIATION OF THE PRE- AND POST-TEST SCORES FOR THE DYNAMIC BALANCE VARIABLE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Experimental N=17</th>
<th>Control N=17</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
</tr>
<tr>
<td>$\bar{X}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.23</td>
<td>12.29</td>
<td>9.52</td>
</tr>
<tr>
<td>$S$</td>
<td>3.64</td>
<td>3.45</td>
</tr>
</tbody>
</table>
FIGURE 9. Mean Dynamic Balance Scores of Pre- and Post-Test (Experimental and Control Groups).
The third null hypothesis that there is no significant difference between experimental and control groups in the total balance scores (static and dynamic) after an eight-week instructional program was rejected. In Table XV and Figure 10 the differences in mean total balance scores (static and dynamic) between the pre- and post-tests for the experimental and control groups are reported. After an eight-week instructional balance program an increase of 6.18 between pre- and post-mean scores for the experimental group was found. The control group's mean-score improved by .71.

The results of testing the equality of regression slopes and overlapping of the confidence bands indicated a significant difference between regression lines of experimental and control groups for students who scored 19 or less on the pre-test of total balance. This inferred that the improvement showed from zero to 19 scores was due to the treatment effect. Experimental group students whose scores were higher than 19 did not improve to the same degree in total balance. This might be due to the effect of the static balance scores on the total balance.
TABLE XV
MEAN AND STANDARD DEVIATION OF PRE- AND POST-TEST SCORES FOR THE TOTAL BALANCE

<table>
<thead>
<tr>
<th>Variable</th>
<th>Experimental N=17</th>
<th>Control N=17</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
</tr>
<tr>
<td>( \bar{X} )</td>
<td>15.76</td>
<td>21.94</td>
</tr>
<tr>
<td>S</td>
<td>8.16</td>
<td>6.58</td>
</tr>
</tbody>
</table>

In general the improvement in total balance performance would appear to support the experimental treatment used in this study. The systematic, progressive and sequential instructional approach was found effective with the hearing-impaired population. Furthermore, the continuous visual effect, either by using a slide program and/or the instructor's demonstration, as well as the kinesthetic cues during the experimental period, apparently contributed to the effectiveness of the treatment. This causal relationship between equilibrium and reliance on the other senses, other than hearing, is in agreement with Travis (1945), Miles (1950), Edwards (1946), Dickinson (1967), and Begbie (1966). These investigators observed that both static and dynamic balance were aided greatly
FIGURE 10. Mean Total Balance Scores of Pre- and Post-Test (Experimental and Control Groups).
when visual and kinesthetic cues were present.

This study demonstrated that an eight-week instructional balance program played an important role in increasing both static and dynamic balance performance for hearing-impaired children ages 6-12 years. The findings of this study support the need observed by Boyd (1967); Lindsey and O'Neal (1976), who explained that deaf students have a need for improved physical education programs and methodologies designed to enhance their motor abilities. More specifically, the balance, equilibrium and kinesthetic skills of the deaf are deficit areas of development. Furthermore, they suggested that experimental studies be conducted to ascertain what kinds of programs or activities are most effective in eliminating or improving the known balance deficits.

Therefore, the methodology and learning activities used in this study have several possibilities for enhancing the balance performance among hearing-impaired population. Educators of the deaf should review the findings of this study for implementation in balance programs with hearing-impaired students.
CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

A review of the literature revealed that deaf children as a group displayed inferior static and/or dynamic balance as compared to non-hearing-impaired children. Unfortunately no investigations have been made to indicate whether the hearing-impaired can improve their balance performance through a specific physical activity program. If such activities could be identified and tested, many educators of the deaf would benefit from the implementation of such a program to eliminate or improve the known balance deficits common with hearing-impaired children. Moreover, such a program could assist hearing-impaired students to reach a higher level of motor and balance behavior.

The major purpose of this study was to determine the effectiveness of an eight-week instructional program, using different activities and apparatus, upon the balance performance (static and dynamic) of hearing-impaired children, ages 6-12. Balance was measured by the Bruininks-Oseretsky Test of Motor Proficiency (Subtest 2: Balance) as a pre- and post-test to determine if significant changes in balance performance occurred due to the eight-week instructional program. Thirty-four hearing-impaired students from the Oregon State School
for the Deaf (OSSD), Salem, Oregon served as subjects in this study; 17 students were randomly assigned to each of the experimental and control groups. Subjects in the experimental group were exposed to the eight-week balance program, while the control group participated in the OSSD physical education curriculum without any special emphasis on balance activities. The eight items which comprise the balance test of the Bruininks-Oseretsky Test of Motor Proficiency were administered to the subjects in the manner suggested in the test manual. A total communication system was utilized to ensure that the students understood the test directions.

One-way analysis of covariance was selected as the appropriate statistical tool to determine if significant differences existed between experimental and control groups regarding the effect of an eight-week instructional program upon the acquisition and improvement of balance performance (static and dynamic). The pre-test served as the covariant and was used as the reference for comparison to the post-test.

The results of this study indicated that an eight-week instructional balance program, using different activities and apparatus, increased the total balance performance among hearing-impaired children, ages 6-12. This research established that the experimental group experienced a statistically significant increase over the control group in the dynamic balance in response
to the prescribed balance program. In regard to static balance, the results showed no significant difference between the adjusted experimental and control group scores over an eight-week period.

Conclusions

The following conclusions were drawn from the results of this investigation:

1. The eight-week instructional balance program as outlined in this study increased the total balance performance among hearing-impaired children, ages 6-12.

2. The eight-week instructional balance program as outlined in this study was found to be more effective for improving dynamic balance than static balance.

Recommendations for Future Studies

To further expand knowledge regarding the effects of instructional programs upon acquisition and improvement of balance performance among hearing-impaired populations, the following research is recommended:

1. Conduct a study similar to the present one for a longer time to determine the relationship between the time span of the program and the improvement of balance performance.

2. Design a study to further investigate the
association of different variables in balance performance, such as: sex, age, etiology, corrected hearing level, hearing loss level, age of onset and educational placement.

3. Compare the progress in balance performance of hearing-impaired subjects with non-hearing-impaired subjects as a result of an instructional program similar to the one in the present study.

4. Replicate this investigation with a larger sample and different age groups using various teachers.

5. Establish the effects of various modes, intensities and durations of activities on improving or eliminating the known balance deficits common with hearing-impaired populations.

6. Develop an appropriate standardized screening test which can be adapted for use with the deaf child to measure specific level of ability or inability in balance skills.

7. Determine whether an intervention program introduced at an early age could eliminate or reduce these potential balance deficits.

8. Conduct an investigation into which etiological groups of deaf children, respond best, least, or not at all to an instructional balance program.

The results of these future studies could supply the information needed to maintain and develop effective
and efficient remedial physical education and early intervention programs for hearing-impaired children. This could help them to reach their highest level of motor and balance behavior and assist them to achieve normal roles in everyday life.


The training of mobile balancing under a minimal visual cue situation. Ergonomics, 1968, 11, 69-75.


The measurement of static ataxia. American Journal of Psychology, 1942, 55, 171-188.


Heward, W.L. & Orlansky, M.D. Exceptional Children. Columbus, Ohio: Carles E. Merrill, 1980.


Static equilibrium as a useful test of motor control. *Journal of Industrial Hygiene*, 1922, 2, 316-331.


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APPENDIX A

PARENT PERMISSION FORM
Dear Parents:

I am a graduate student at Oregon State University, working on a doctoral's degree in education. My past experience in the area of physical education as a member of faculty at the University of Helwan, Alexandria, Egypt since 1965 combined with my present interest in the area of hearing-impaired, encouraged me to select this study for my Ph.D degree.

The project I am undertaking is supervised by Dr. John Dunn, Chairman of the Physical Education Department at Oregon State University. The purpose of this study is to determine the effect of eight weeks balance program upon the acquisition and improvement of balance performance among hearing-impaired children ages six through twelve. By developing such a program, the adapted physical educator will be able to better plan, sound, progressive, and corrective physical education programs to eliminate and improve the known balance deficits for our hearing-impaired children.

Your child will be enrolled in an eight week program focused on balance activities in his/her regular physical education classes. Also, he/she will be tested before and after the eight weeks period. The test that will be used is the Bruininks-Oseretksky Test of Motor Proficiency, which is a standardized test described on the consent form following this letter. The part selected from this test is the balance items only. These items are ones that your child may be familiar with because they are often used with many school age children throughout the United States. Neither the test or the program presents any risk to your child.

I would like to ask permission to use your child's test scores as part of the data for this study. The name of your child will be used only when working with the data, but confidentiality in release of the data will be strictly enforced. You may at any time withdraw your permission to use your child's scores.

I would be happy to answer any questions regarding the study that you may have. A summary of the results will be available at your request.

Thank you for your time and consideration.

Sincerely,

Adel Aly Hassan
Oregon State University
Department of Physical Education
Corvallis, Oregon 97331
(503) 926-6380
CONSENT FORM

STUDENT'S NAME ____________________________

DESCRIPTION OF THE RESEARCH

The proposed study investigates the effect of an eight-weeks balance program upon the acquisition and improvement of balance performance among hearing-impaired children ages six through twelve. Balance skills will be assessed by the Bruininks-Oseretsky Test of Motor Proficiency (Sub-test 2: Balance only). This test is nationally standardized with normative data for ages four and one-half through fourteen and one-half years. The balance Sub-test items include standing, walking and stepping on a line and balance beam to measure both the static and dynamic balance skill.

This test is used in public schools nationwide as a screening device for motor performance including skill. The Sub-test 2 (balance) presents no risks to the child. It takes approximately 10 minutes. The test will be conducted on an individual basis by a trained adapted physical educator with help from an interpreter who will sign and demonstrate directions. Visual stimulation will be used to reach the optimum communication possible. All data will be grouped data and individuals will remain anonymous. The study is designed to determine if there is any increase in the balance performance of the experimental group as a result of the eight weeks instructional balance program, so that an effective and specified plan may be designed to eliminate and improve the balance problems.

This is to certify that I agree to allow my child to participate in the above study by Adel A. Hassan, under the supervision of Dr. John M. Dunn, Chairman of Physical Education Department at Oregon State University. I understand the purpose of the research and the test that are to be given. I also understand that if I have any questions they will be answered by the researcher personally or by mail:

Adel Aly Hassan
Oregon State University
Department of Physical Education
Corvallis, Oregon 97331
(503) 926-6380

I hereby give my consent for ____________________________ to participate in this study. I reserve the right to withdraw my child and discontinue participation at any time.

(Parent/Guardian's Signature)

(Parent/Guardian's Name Printed)

Date
APPENDIX B

HUMAN SUBJECTS COMMITTEE PERMISSION
OREGON STATE UNIVERSITY
Committee for Protection of Human Subjects

Summary of Review

TITLE: Effect of an Eight-Week Instructional Program upon the Acquisition and Improvement of Balance Performance Among Hearing-Impaired Children, Ages 6-12.

PROGRAM DIRECTOR: John M. Dunn (Adel Aly Hassan)

RECOMMENDATION:

XX Approval
Provisional Approval
Disapproval
No Action

REMARKS:

The second sentence in the fourth paragraph of the Parent Permission Form should be changed to read as follows:

"The name of your child will be used only when working with the data, but confidentiality in release of the data will be strictly enforced."

Date: January 13, 1982

cc: Committee Chairman
mep

Signature:

Rod. V. Frakes
Associate Dean of Research
Phone: 754-3439
APPENDIX C

BRUININKS-OSERETSKY TEST DIRECTIONS
FOR SUBTEST 2: BALANCE AND
INDIVIDUAL RECORD FORM
SUBTEST 2: Balance

Subtest 2 has eight items that measure specific balance skills.

KIT EQUIPMENT: target, masking tape, balance beam, response speed stick
OTHER EQUIPMENT: stopwatch

GENERAL DIRECTIONS

1. Require the subject to wear tennis or crepe-soled shoes.
2. Prepare the target and walking line as shown in Figures 1 and 2.
   a. Fasten the target to the wall with masking tape so that the lowest point on the circumference is at the subject's eye level.
   b. Make a walking line by taping an 8-foot (2.4 meter) piece of masking tape to the floor in front of the target, about 10 feet (3 meters) from the wall. The walking line should be as straight as possible.
3. For all items, stand next to the subject to observe performance most efficiently.
4. For all items, administer a second trial only if the subject does not achieve a maximum score on the first trial. When a second trial is necessary, the subject's errors should be pointed out before the second trial is administered. For example, say: "Let's do it again, but this time try to keep your knee bent and try not to move the leg you are standing on."

Reprinted with permission from American Guidance Service.
SUBTEST 2 / Item 1

Standing on Preferred Leg on Floor

The subject stands on preferred leg on the walking line, looking at the target, with hands on hips, and with other leg bent so that it is parallel to the floor, as shown in Figure 3. The subject must maintain the position for 10 seconds to achieve a maximum score.

Trials: 2 Administer a second trial only if the subject does not achieve a maximum score on the first trial.

ADMINISTERING AND RECORDING

Say: Place your (right/left*) leg on this line (point to walking line) and raise your other leg like this (demonstrate). Place your hands on your hips and look at the target (point to target). Stand like this until I tell you to stop.

If necessary, help subject achieve the correct position. Begin timing as soon as position is achieved and remind subject as needed to keep hands on hips and to look at target. Slight swaying is acceptable. Allow only one warning to keep the raised leg parallel to the floor (or above a 45° angle).

After 10 seconds, tell the subject to stop. Stop the trial and record the time before 10 seconds if the subject:

a. drops the raised leg so that it touches the floor
b. drops the raised leg below a 45° angle after one warning, as shown in Figure 3.
c. hooks the raised leg behind the supporting leg, as shown in Figure 3.
d. shifts the supporting foot out of place.

On the Individual Record Form, record to the nearest second the time that the subject maintains the correct position.

Figure 3 Standing on preferred leg on walking line or balance beam
(Subtest 2: Items 1,2,3).
SUBTEST 2 / Item 2

Standing on Preferred Leg on Balance Beam

The subject stands on preferred leg on the balance beam, looking at the target, with hands on hips, and with other leg bent so that it is parallel to the floor, as shown in Figure 3. The subject must maintain the position for 10 seconds to achieve a maximum score.

Trials: 2  Administer a second trial only if the subject does not achieve a maximum score on the first trial.

ADMINISTERING AND RECORDING

Place the balance beam over the walking line.

Say: Stand on the beam on your (right/left) leg and raise your other leg like this (demonstrate). Place your hands on your hips and look at the target. Stand like this until I tell you to stop.

If necessary, help subject achieve the correct position. Begin timing as soon as position is achieved and remind subject as needed to keep hands on hips and to look at target. Slight swaying is acceptable. Allow only one warning to keep the raised leg parallel to the floor (or above a 45° angle).

After 10 seconds, tell the subject to stop. Stop the trial and record the time before 10 seconds if the subject:

a. drops the raised leg so that it touches the floor
b. drops the raised leg below a 45° angle after one warning, as shown in Figure 3.
c. hooks the raised leg behind the supporting leg, as shown in Figure 3.
d. shifts the supporting foot out of place.

On the Individual Record Form, record to the nearest second the time that the subject maintains the correct position.
SUBTEST 2 / Item 3

Standing on Preferred Leg on Balance Beam -- Eyes Closed

The subject stands on preferred leg on the balance beam, with eyes closed, hands on hips, and with other leg bent so that it is parallel to the floor, as shown in Figure 3. The subject must maintain the position for 10 seconds to achieve a maximum score.

Trials: 2 Administer a second trial only if the subject does not achieve a maximum score on the first trial.

ADMINISTERING AND RECORDING

Say: Stand on the beam on your (right/left) leg and raise your other leg like this (demonstrate). Place your hands on your hips and look at the target. Now close your eyes and stand like this until I tell you to stop.

If necessary, help subject achieve the correct position. Begin timing as soon as position is achieved and remind the subject as needed to keep hands on hips. Slight swaying is acceptable. Allow only one warning to keep the raised leg parallel to the floor (or above a 45° angle).

After 10 seconds, tell the subject to stop. Stop the trial and record the time before 10 seconds if the subject:
   a. drops the raised leg so that it touches the floor or beam
   b. drops the raised leg below a 45° angle after one warning, as shown in Figure 3.
   c. hooks the raised leg behind the supporting leg, as shown in Figure 3.
   d. shifts the supporting foot out of place
   e. opens eyes.

On the Individual Record Form, record to the nearest second the time that the subject maintains the correct position.

Remove balance beam from walking line and remove target from wall.
SUBTEST 2 / Item 4

Walking Forward on Walking Line

The subject walks forward on the walking line in a normal walking stride with hands on hips. The subject must walk forward six steps to achieve a maximum score.

Trials: 2 Administer a second trial only if the subject does not achieve a maximum score on the first trial.

ADMINISTERING AND RECORDING

Have the subject stand at one end of the walking line. Say: Place your feet on the line like this (demonstrate placing one foot slightly ahead of the other). Now place your hands on your hips and walk slowly to the end of the line. Ready, begin.

Count the subject's steps. Remind the subject as needed to keep hands on hips. After six steps have been taken, tell the subject to stop. If the subject places one or both feet completely off the line before taking six steps, stop the trial and record the number of steps taken on the line.

On the Individual Record Form, record the number of steps taken on the walking line.
**SUBTEST 2 / Item 5**

Walking Forward on Balance Beam

The subject walks forward on the balance beam in a normal walking stride with hands on hips. The subject must walk forward six steps to achieve a maximum score.

**Trials:** 2  Administer a second trial only if the subject does not achieve a maximum score on the first trial.

**ADMINISTERING AND RECORDING**

Place the balance beam over the walking line.

Have the subject stand at one end of the beam. Say: **Place your feet on the beam like this** (demonstrate placing one foot slightly ahead of the other). **Place your hands on your hips and walk slowly to the end of the beam.** Ready, begin.

Count the subject's steps. Remind the subject as needed to keep hands on hips. After six steps have been taken, tell the subject to stop. If the subject places one or both feet completely off the beam before taking six steps, stop the trial and record the number of steps taken on the beam.

On the Individual Record Form, record the number of steps taken on the balance beam.

Remove balance beam from walking line.
SUBTEST 2 / Item 6

Walking Forward Heel-to-Toe on Walking Line

The subject walks forward on the walking line heel-to-toe, with hands on hips, as shown in Figure 4. The subject must make six consecutive steps correctly to achieve a maximum score.

Trials: 2  Administer a second trial only if the subject does not achieve a maximum score on the first trial.

Figure 4. Walking forward heel-to-toe on walking line or balance beam (Subtest 2: Items 6-7).

ADMINISTERING AND RECORDING

Have the subject stand at one end of the walking line. Say: Place your feet on the line. Place your hands on your hips. When you walk, hit the toe of your back foot with the heel of your front foot (demonstrate). Walk to the end of the line. Remember, keep your feet on the line and your hands on your hips as you walk. Ready, begin.

Stand at one side of the line and count the subject’s steps, keeping track of both correct and incorrect steps for six steps. A step is incorrect if the subject:

a. does not touch the heel of the front foot to the toe of the back foot
b. moves the back foot forward to touch the heel of the front foot.

Remind the subject as needed to walk heel-to-toe and to keep hands on hips. After six steps have been taken, tell the subject to stop. If the subject places one or both feet completely off the line before taking six steps, stop the trial and record the number of steps taken on the line.

On the Individual Record Form, record the number of correct and incorrect steps. Use “1” for correct steps and “0” for incorrect steps. For example, 1-1-0-1-1-0 equals a score of 4.
SUBTEST 2 / Item 7

Walking Forward Heel-to-Toe on Balance Beam

The subject walks forward on the balance beam heel-to-toe, with hands on hips, as shown in Figure 4. The subject must make six consecutive steps correctly to achieve a maximum score.

Trials: 2 Administer a second trial only if the subject does not achieve a maximum score on the first trial.

ADMINISTERING AND RECORDING

Place the balance beam over the walking line.

Have the subject stand at one end of the beam. Say: Place your feet on the beam like this (demonstrate). Place your hands on your hips. When you walk down the beam, hit the toe of your back foot with the heel of your front foot (demonstrate). Walk to the end of the beam. Remember, keep your feet on the beam and your hands on your hips as you walk. Ready, begin.

Stand at one side of the beam and count the subject’s steps, keeping track of both correct and incorrect steps. A step is incorrect if the subject:

a. does not touch the heel of the front foot to the toe of the back foot
b. moves the back foot forward to touch the heel of the front foot.

Remind the subject as needed to walk heel-to-toe and to keep hands on hips. After six steps have been taken, tell the subject to stop, if the subject places one or both feet completely off the beam before taking six steps, stop the trial and record the number of steps taken on the beam.

On the Individual Record Form, record the number of correct and incorrect steps. Use “1” for correct steps and “0” for incorrect steps. For example, 1-1-0-1-1-0 equals a score of 4.
SUBTEST 2 / Item 8

Stepping Over Response Speed Stick on Balance Beam

The subject walks forward on the balance beam stepping over the response speed stick held at the middle of the beam by the examiner, as shown in Figure 5. The subject walks in a normal walking stride with hands on hips. The score is recorded as a pass or a fail.

Trials: 2  Administer a second trial only if the subject does not pass on the first trial.

![Correct](image1)
![Incorrect](image2)

_Figure 5._ Stepping over response speed stick on balance beam (Subtest 2, Item 8).

**ADMINISTERING AND RECORDING**

Have the subject stand at one end of the beam. Kneel beside the center of the beam and hold the stick over the beam at a height slightly below the subject's knee.

_Say:_ Place your feet on the beam. Place your hands on your hips. When I say begin, walk slowly down the beam and step over the stick without touching it. Be sure to step over the stick; don't swing your leg around it. Keep your hands on your hips and walk to the end of the beam. Ready, begin.

Position the stick far enough over the beam so that the subject will have difficulty swinging a leg around it.

Stop the trial and record a fail if the subject:
- a. touches the stick firmly when stepping over it (It is acceptable for subject's slacks to brush lightly against stick.)
- b. swings leg around the end of the stick, as shown in Figure 5.
- c. steps off the beam.

On the Individual Record Form, record pass or fail.
<table>
<thead>
<tr>
<th>POINT SCORE</th>
<th>STANDARD SCORE</th>
<th>PERCENTILE RANK</th>
<th>STANINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

BRUININKS-OSERETSKY TEST OF MOTOR PROFICIENCY / Robert H. Bruininks, Ph.D.

INDIVIDUAL RECORD FORM

COMPLETE BATTERY AND SHORT FORM

NAME ____________________________ SEX: Boy ☐ Girl ☐ GRADE ______
SCHOOL/AGENCY ______________________ CITY ______ STATE ______
EXAMINER __________________________
PURPOSE OF TESTING

<table>
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<tr>
<th>Arm Preference: (circle one)</th>
<th>Leg Preference: (circle one)</th>
<th>Year</th>
<th>Month</th>
<th>Day</th>
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<td>RIGHT</td>
<td>LEFT</td>
<td>MIXED</td>
<td>RIGHT</td>
<td>LEFT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Date Tested ______ ______ ______
Date of Birth ______ ______ ______
Chronological Age ______ ______ ______

CAUSE OF DEAFNESS ____________________________
LEVEL OF IMPAIRMENT ____________________________ dB PTA

TEST: Pre ☐ Post ☐ GROUP: Control ☐ Experimental ☐ SUBJECT NO. __________
SUBTEST 2: Balance

1. Standing on Preferred Leg on Floor (10 seconds maximum per trial)
   TRIAL 1: _______ seconds TRIAL 2: _______ seconds
   Raw Score: 0 1 2 3 4 5 6 7 8 9 10
   Point Score: 0 1 2 3 4

2. Standing on Preferred Leg on Balance Beam (10 seconds maximum per trial)
   TRIAL 1: _______ seconds TRIAL 2: _______ seconds
   Raw Score: 0 1 2 3 4 5 6 7 8 9 10
   Point Score: 0 1 2 3 4 5 6

3. Standing on Preferred Leg on Balance Beam – Eyes Closed (10 seconds maximum per trial)
   TRIAL 1: _______ seconds TRIAL 2: _______ seconds
   Raw Score: 0 1 2 3 4 5 6 7 8 9 10
   Point Score: 0 1 2 3 4 5 6 7

4. Walking Forward on Walking Line (6 steps maximum per trial)
   TRIAL 1: _______ steps TRIAL 2: _______ steps
   Raw Score: 0 1 2 3 4 5
   Point Score: 0 1 2 3

5. Walking Forward on Balance Beam (6 steps maximum per trial)
   TRIAL 1: _______ steps TRIAL 2: _______ steps
   Raw Score: 0 1 2 3 4 5
   Point Score: 0 1 2 3

6. Walking Forward Heel-to-Toe on Walking Line (6 steps maximum per trial)
   TRIAL 1: _______ steps TRIAL 2: _______ steps
   Raw Score: 0 1 2 3 4 5
   Point Score: 0 1 2 3

7. Walking Forward Heel-to-Toe on Balance Beam (6 steps maximum per trial)
   TRIAL 1: _______ steps TRIAL 2: _______ steps
   Raw Score: 0 1 2 3 4 5
   Point Score: 0 1 2 3 4

8. Stepping Over Response Speed Stick on Balance Beam
   TRIAL 1: Fail Pass TRIAL 2: Fail Pass
   Raw Score: Fail Pass
   Point Score: 0 1
APPENDIX D

SAMPLE OF
TASK EVALUATION AND BASELINE SHEET
## SAMPLE OF
**TASK EVALUATION AND BASELINE SHEET**

<table>
<thead>
<tr>
<th>NO.</th>
<th>TASK (Performance Objective)</th>
<th>STEPS OR PHASES (Enabling Objectives)</th>
<th>CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Too Easy</td>
</tr>
</tbody>
</table>
| 1.  | Walking on tip-toes on line 8' long. | a) Walking on line.  
b) Tip toes forward-eyes open.  
c) Tip toes forward-eyes closed.  
d) Tip toes forward-bean bag on head.  
e) Tip toes backward-bean bag on head. | X            | ✓           |              |
| 2.  | Walking on heels on line 8' long. | a) Walking on line.  
b) Walking on heels forward-eyes open.  
c) Walking on heels forward-eyes closed.  
d) Walking on heels forward-bean bag on head.  
e) Walking on heels backward-bean bag on head. | X            | ✓           |              |
| 3.  | Hopping alternately on line 8' long. | a) Hopping alternately-in place.  
b) Hopping alternately-forward.  
c) Hopping alternately-backward.  
d) Hopping alternately-in place with bean bag on head.  
e) Hopping alternately-forward, eyes closed. | ✓            | ✓           |              |
| 4.  | Walking sideways, with crossover step on line 8' long. | a) Walking sideways.  
b) In front of lead leg.  
c) Behind lead leg.  
d) In front of and behind lead leg.  
e) In front of and behind lead leg, tip toes. | X            | ✓           |              |
APPENDIX E

LESSON PLAN
LESSON NO. (1)

UNIT: Balance

SUB UNIT: Dynamic Balance

MATERIAL: Tape (Guideline) 8' long

DATE: Monday, April 12, 1982

TASK (A):

Walking tip toes on line.

PREREQUISITE SKILL:

Walking on line.

PERFORMANCE OBJECTIVE:

Student walks on tip toes forward on line 8' long, arms stretched sideways, eyes open, eyes closed, and holding a good posture while balancing bean bag on top of head.

ENABLING OBJECTIVES:

1. Student walks tip toes forward on line 8' long, arms stretched sideways, eyes open.

2. Student walks tip toes forward on line 8' long, arms stretched sideways, eyes closed.

3. Student walks tip toes forward on line 8' long, arms stretched sideways, and holding a good posture while balancing a bean bag on top of head.
TASK ( B ):

Walking on heels on line.

PREREQUISITE SKILLS:

Walking tip toes on line.

PERFORMANCE OBJECTIVE:

Student walks on heels forward on line 8' long, arms stretched sideways, eyes open, eyes closed, and holding a good posture while balancing a bean bag on top of head.

ENABLING OBJECTIVES:

1. Student walks forward on heels on line 8' long, arms stretched sideways, eyes open.

2. Student walks forward on heels on line 8' long, arms stretched sideways, eyes closed.

3. Student walks on heels forward on line 8' long, arms stretched sideways, and holding a good posture while balancing a bean bag on top of head.
LESSON NO. (2)

UNIT: Balance

SUB UNIT: Dynamic Balance

MATERIAL: Tape (Guideline) 8' long

DATE: Tuesday, April 13, 1982

TASK (A):

Hopping alternately on line.

PREREQUISITE SKILLS:

Walking on tip toes and on heels on line 8' long, holding a good posture and looking straight ahead.

PERFORMANCE OBJECTIVE:

Student hops alternately in place, forward, and backwards, arms stretched sideways on line 8' long, holding a good posture and looking straight ahead.

ENABLING OBJECTIVES:

1. Student hops alternately on one foot in place, arms stretched sideways, on line 8' long, holding a good posture and looking straight ahead.

2. Student hops alternately on one foot forward, arms stretched sideways, on line 8' long, holding a good posture and looking straight ahead.

3. Student hops alternately on one foot backward, arms stretched sideways, on line 8' long, holding a good posture and looking straight ahead.
TASK (8):

Walking sideways using cross-over step.

PREREQUISITE SKILLS:

Walking sideways by sliding the foot on a line 8' long.

PERFORMANCE OBJECTIVE:

Student walks sideways, arms stretched sideways, on line 8' long, using alternately a crossover step in front of and behind the lead leg.

ENABLING OBJECTIVES:

1. Student walks sideways, arms stretched sideways, on line 8' long, using a crossover step in front of the lead leg.

2. Student walks sideways, arms stretched sideways, on line 8' long, using a crossover step behind the lead leg.

3. Student walks sideways, arms stretched sideways, on line 8' long, using alternately a crossover step in front of and behind the lead leg.
LESSON NO. ( 3 )

UNIT: Balance  SUB UNIT: Dynamic Balance

MATERIAL: Tape (Guideline) 8' long  DATE: Wednesday, April 16, 1982

TASK ( A ):

Hop shift and landing on line.

PREREQUISITE SKILLS:

Walking, hopping on line 8' long.

PERFORMANCE OBJECTIVE:

Student stands on the line 8' long, with one foot in front of the other, arms stretched sideways, jumps up enough to quickly shift places with feet.

ENABLING OBJECTIVES:

1. Student stands on the line 8' long with one foot in front of the other, hands on hips, jumps up and lands on line in same position.

2. Student stands on the line 8' long with one foot in front of the other, hands on hips, jumps up enough to quickly shift places with feet.

3. Student stands on the line 8' long with one foot in front of the other, arms stretched sideways, jumps up enough to quickly shift places with feet.
TASK (B):

Double lame dog walk on line.

PREREQUISITE SKILLS:

Walking forward on four points (hands and feet) on line 8' long.

PERFORMANCE OBJECTIVE:

Student moves forward on line 8' long with preferred hand and foot (same side), while holding other arm and leg in upward position.

ENABLING OBJECTIVES:

1. Student moves forward on line 8' long on three points (two hands and one foot).

2. Student moves forward on line 8' long in cross-lateral movements (right hand and left leg or left hand and right leg), while holding other arm and leg in upward position.

3. Student moves forward on line 8' long with preferred hand and foot (same side), while holding other arm and leg in upward position.
LESSON NO. (4)

UNIT: Balance  SUB UNIT: Dynamic Balance

MATERIAL: Tape (Guideline) 8' long  DATE: Thursday, April 15, 1982

TASK (A):

Wicket walk sideways on line.

PREREQUISITE SKILLS:

Crawling forward on four points (hands and feet) on line.

PERFORMANCE OBJECTIVE:

Student walks sideways on line 8' long, hands grasping the ankles, knees held straight.

ENABLING OBJECTIVES:

1. Student walks forward on line 8' long on four points (hands and feet), with elbows and knees bent.

2. Student bends forward and walks on line 8' long, arms stretched sideways, knees held straight.

3. Student walks sideways on line 8' long, hands grasping the ankles, knees held straight.
TASK( 8 ):

Duck Walk on line.

PREREQUISITE SKILLS:

Walking on tip toes and heels on line.

PERFORMANCE OBJECTIVE:

Student bends to a half squat and walks forward placing toe, then heel on the line 8' long, arms stretched sideways.

ENABLING OBJECTIVES:

1. Student walks forward toe to heel on line 8' long, hands on hips.

2. Student bends to a half squat and walks forward placing toe, then heel on line 8' long, hands on hips.

3. Student bends to a half squat and walks forward placing toe, then heel on line 8' long, arms stretched sideways.
LESSON NO. (5)

UNIT: Balance
SUB UNIT: Static Balance

MATERIAL: Bench
DATE: Monday, April 19, 1982

TASK (A):

Seat balance.

PREREQUISITE SKILLS:

Holding a V-sit position on the floor for five seconds.

PERFORMANCE OBJECTIVE:

Student sits on bench, arms stretched sideways in V-sit position, legs held out straight for 15 seconds.

ENABLING OBJECTIVES:

1. Student sits on and grasps the sides of bench with both hands, knees bent forward, feet are held off the bench.

2. Student sits on bench, arms stretched sideways, knees bent forward, feet are held off the bench.

3. Student sits on bench, arms stretched sideways, in V-sit position, legs held out straight.

The following steps are to be used with objectives 1-3:

a. Time: 5 seconds
b. Time: 10 seconds
c. Time: 15 seconds
TASK( b ):

Single leg balance.

PREREQUISITE SKILLS:

Standing tip toes on preferred leg on floor, with arms stretched sideways, other leg bent forward for five seconds.

PERFORMANCE OBJECTIVE:

Student stands on preferred leg on bench, arms stretched forward, other leg held straight back parallel to bench for 10 seconds.

ENABLING OBJECTIVES:

1. Student stands tip toes on preferred leg on bench, arms stretched sideways, other knee bent forward.

2. Student stands on preferred leg on bench, arms stretched forward, other leg bent back parallel to bench.

3. Student stands on preferred leg on bench, arms stretched forward, other leg held straight back parallel to bench.

The following steps are to be used with objectives 1-3:

a. Time: 3 seconds
b. Time: 5 seconds
c. Time: 10 seconds
LESSON NO. ( 6 )

UNIT: Balance  SUB UNIT: Static Balance

MATERIAL: Bench  DATE: Tuesday, April 20, 1982

TASK (A):

Tummy balance.

PREREQUISITE SKILLS:

Holding tummy balance position on floor for three seconds.

PERFORMANCE OBJECTIVE:

Student lays on tummy horizontal across bench, arms and legs extended upward for 15 seconds.

ENABLING OBJECTIVES:

1. Student lays on tummy horizontal across bench, raises legs up while hands touch floor.

2. Student lays on tummy horizontal across bench, raises arms and head up while feet touch floor.

3. Student lays on tummy horizontal across bench, arms and legs extended upward.

The following steps are to be used with objectives 1-3:

a. Time: 5 seconds.
b. Time: 10 seconds.
c. Time: 15 seconds.
TASK (b):

Balance on two points.

PREREQUISITE SKILLS:

Balancing on three points (two hands and one foot) placed on line on floor for five seconds.

PERFORMANCE OBJECTIVE:

Student balances on two points (one hand and one foot) in a bilateral movement (same side) on bench for 10 seconds.

ENABLING OBJECTIVES:

1. Student balances on three points, (two hands and one foot) on bench.

2. Student balances on two points (one hand and one foot) in a cross-lateral movement (one hand and its opposite foot) on bench.

3. Student balances on two points (one hand and one foot) in a bilateral movement (same side) on bench.

The following steps are to be used with objectives 1-3:

a. Time: 3 seconds.
b. Time: 5 seconds.
c. Time: 10 seconds.
LESSON NO.  ( 7 )

UNIT: Balance  SUB UNIT: Dynamic Balance

MATERIAL: Bench  DATE: Wednesday, April 21, 1982

TASK (A):

Crab walk.

PREREQUISITE SKILLS:

Crab walk with both hands and feet on line on floor.

PERFORMANCE OBJECTIVE:

Student moves in a crab walk on bench, hips held up in a straight level position while balancing a bean bag on the tummy.

ENABLING OBJECTIVES:

1. Student moves in a crab walk on bench, hips relaxed but not touching bench.

2. Student moves in a crab walk on bench, hips held up in a straight level position.

3. Student moves in a crab walk on bench, hips held up in a straight level position while balancing a bean bag on the tummy.
TASK (B):

Thread the needle.

PREREQUISITE SKILLS:

Thread the needle by standing on the floor holding a folded jumping rope in front of the body.

PERFORMANCE OBJECTIVE:

Student stands on bench, locking fingers in front, steps through fingers with one foot and back out again to original position.

ENABLING OBJECTIVES:

1. Student stands on bench, holding a folded jumping rope in front, steps over rope with one foot and back again to original position, repeat with other leg.

2. Student stands on bench, touching the fingertips together in front, steps through with one foot and back again to original position, repeat with the other leg.

3. Student stands on bench, locking fingers in front, steps through fingers with one foot and back out again to original position, repeat with the other leg.
LESSON NO. (8.

UNIT: Balance

SUB UNIT: Dynamic Balance

MATERIAL: Bench

DATE: Thursday, April 22, 1982

TASK (A):

Squat and up from sitting.

PREREQUISITE SKILLS:

Standing up from sitting position with one knee bent and arms stretched sideways on line on floor.

PERFORMANCE OBJECTIVE:

Student sits on bench, both legs straight, arms stretched sideways, bean bag on top of head, squats and balances while standing up.

ENABLING OBJECTIVES:

1. Student sits on bench, one knee bent, other straight, arms stretched sideways, squats and balances while standing up.

2. Student sits on bench, both legs straight, arms stretched sideways, squats and balances while standing up.

3. Student sits on bench, both legs straight, arms stretched sideways, bean bag on top of head, squats and balances while standing up.
TASK (8):

Squat with one leg.

PREREQUISITE SKILLS:

Balancing while squatting with preferred leg, other leg held straight forward off the floor, arms stretched sideways.

PERFORMANCE OBJECTIVE:

Student stands on bench, arms stretched sideways, balancing bean bag on top of head while squatting down and up on preferred leg, other leg held straight forward parallel to the bench.

ENABLING OBJECTIVES:

1. Student stands on bench, arms stretched sideways, balancing while squatting down and up with both legs.

2. Student stands on bench, arms stretched sideways, balancing while squatting down and up on preferred leg, other leg held straight forward parallel to the bench.

3. Student stands on bench, arms stretched sideways, balancing bean bag on top of head while squatting down and up on preferred leg, other leg held straight forward parallel to the bench.
UNIT: Balance

SUB UNIT: Static Balance

MATERIAL: Bean Bag

DATE: Monday, April 26, 1982

TASK ( A ):

One foot balance, bean bag on head.

PREREQUISITE SKILLS:

Standing on one foot with eyes open.

PERFORMANCE OBJECTIVE:

Student stands on preferred foot, one arm stretched forward, other arm grasps the free foot from the back, balances bean bag on head for 15 seconds.

ENABLING OBJECTIVES:

1. Student stands on preferred leg, arms stretched sideways, other leg extended straight forward, balances bean bag on head.

2. Student stands on preferred leg, arms stretched sideways, other leg is bent backward, balances bean bag on head.

3. Student stands on preferred foot, one arm stretched forward, other arm grasps the free foot from the back, balances bean bag on head.

The following steps are to be used with objectives 1-3:

a. Time: 5 seconds.
b. Time: 10 seconds.
c. Time: 15 seconds.
**TASK(8):**

Front scale with bean bag on head.

**PREREQUISITE SKILLS:**

Standing on one foot with eyes open for two seconds.

**PERFORMANCE OBJECTIVE:**

Student stands on preferred leg, arms stretched sideways, other leg held straight back parallel to the floor, balances bean bag on head for 5 seconds.

**ENABLING OBJECTIVES:**

1. Student stands on preferred leg, hands placed on hips, other leg bent backward, balances bean bag on head.

2. Student stands on preferred leg, arms stretched sideways, other leg bent backward, balances bean bag on head.

3. Student stands on preferred leg, arms stretched sideways, other leg held straight back parallel to the floor, balances bean bag on head.

The following steps are to be used with objectives 1-3:

a. Time: 2 seconds.
b. Time: 3 seconds.
c. Time: 5 seconds.
UNIT: Balance  SUB UNIT: Static Balance

MATERIAL: Bean Bag  DATE: Tuesday, April 27, 1982

TASK (A):

Front scale standing on bean bag.

PREREQUISITE SKILLS:

Standing on one foot with eyes open for two seconds.

PERFORMANCE OBJECTIVE:

Student stands on preferred foot on bean bag, arms stretched sideways, other leg held straight back parallel to the floor for 5 seconds.

ENABLING OBJECTIVES:

1. Student stands on preferred foot, arms stretched upward, other leg stretched backward to touch the bean bag on floor.

2. Student stands on preferred foot on bean bag, arms stretched sideways, other leg held straight forward parallel to the floor.

3. Student stands on preferred foot on bean bag, arms stretched sideways, other leg held straight back parallel to the floor.

The following steps are to be used with objectives 1-3:

a. Time: 2 seconds.
b. Time: 3 seconds.
c. Time: 5 seconds.
TASK (8):

Side push-up position on one hand and one foot.

PREREQUISITE SKILLS:

Push-up position, straight body and arms.

PERFORMANCE OBJECTIVE:

Student balances on one hand and one foot on side in push-up position, bean bag placed on floor under hips for 10 seconds.

ENABLING OBJECTIVES:

1. Student balances on one hand and two feet on side in push-up position, bean bag placed on floor under hips.

2. Student balances on one hand and one foot on side in push-up position, bean bag placed on floor under hips.

The following steps are to be used with objectives 1 and 2:

a. Time: 5 seconds.
b. Time: 10 seconds.
UNIT: Balance
SUB UNIT: Dynamic Balance
MATERIAL: Mini-Trampoline
DATE: Wednesday, April 27, 1982

TASK (A):
Bounce off.

PREREQUISITE SKILLS:
Jumping up on both feet while circling the arms upward over the head, on the floor.

PERFORMANCE OBJECTIVE:
Student bounces with both feet in center of mini-trampoline 3 times without assistance, followed by a bounce off, finishes in landing posture on mat.

ENABLING OBJECTIVES:
1. Student bounces with both feet in center of mini-trampoline 3 times with assistance.

2. Student bounces with both feet in center of mini-trampoline 3 times without assistance.

3. Student bounces with both feet in center of mini-trampoline 3 times without assistance, followed by a bounce off, finishes in landing posture on mat.
LESSON NO. (12)
UNIT: Balance
MATERIAL: Mini-Trampoline
TASK (A):
180° turn on both sides.
PREREQUISITE SKILLS:
Bouncing in center of mini-trampoline with both feet.

PERFORMANCE OBJECTIVE:
Student bounces with both feet in center of mini-trampoline 3 times without assistance, followed by a high bounce and turning body 180° alternating both sides (right and left).

ENABLING OBJECTIVES:
1. Student bounces with both feet in center of mini-trampoline 3 times without assistance, followed by a high bounce and turning body 180° on right side.
2. Student bounces with both feet in center of mini-trampoline 3 times without assistance, followed by a high bounce turning body 180° on left side.
3. Student bounces with both feet in center of mini-trampoline 3 times without assistance, followed by a high bounce and turning body 180° alternating both sides (right and left).
TASK(8):

360° turn on preferred side.

PREREQUISITE SKILLS:

180° turn on preferred side.

PERFORMANCE OBJECTIVE:

Student bounces one time with both feet in center of mini-trampoline without assistance, followed by a high bounce and turning body 360° on preferred side.

ENABLING OBJECTIVES:

1. Student bounces 3 times with both feet in center of mini-trampoline without assistance, followed by a high bounce and turning body 360° on preferred side.

2. Student bounces 2 times with both feet in center of mini-trampoline without assistance, followed by a high bounce and turning body 360° on preferred side.

3. Student bounces one time with both feet in center of mini-trampoline without assistance, followed by a high bounce and turning body 360° on preferred side.
Lesson No. (13)

Unit: Balance
Sub Unit: Static Balance

Material: Tape (Guideline) 8' long
Date: Monday, May 3, 1982

Task (A):

Toe stand.

Prerequisite Skills:

Standing with feet apart, arms held sideways with eyes open for ten seconds.

Performance Objective:

Student begins in a full squat position on line 8' long, arms dangling at sides, jumps upward into straddle leg extension with weight on toes of both feet, flings arms out diagonally, holds position for 10 seconds.

Enabling Objectives:

1. Student begins in a full squat position on line 8' long, arms dangling at sides, jumps upward into straddle leg extension with weight on toes of both feet, places hands on hips, holds position.

2. Student begins in a full squat position on line 8' long, arms dangling at sides, jumps upward into straddle leg extension weight on toes of both feet, flings arms out diagonally, holds position.

The following steps are to be used with objectives 1 and 2:

a. Time: 5 seconds.
b. Time: 10 seconds.
TASK(8):

Heel stand.

PREREQUISITE SKILLS:

Standing with feet apart, arms held sideways with eyes open for ten seconds.

PERFORMANCE OBJECTIVE:

Student begins in a full squat position on line 8' long, arms dangling at sides, jumps upward into straddle leg extension with weight on both heels, flings arms out diagonally, holds position for 5 seconds.

ENABLING OBJECTIVES:

1. Student begins in a full squat position on line 8' long, arms dangling at sides, jumps upward into straddle leg extension with weight on both heels, places hands on hips, holds position.

2. Student begins in a full squat position on line 8' long, arms dangling at sides, jumps upward into straddle leg extension with weight on both heels, flings arms out diagonally, holds position.

The following steps are to be used with objectives 1 and 2:

a. Time: 3 seconds.
b. Time: 5 seconds.
LESSON NO. (14)

UNIT: Balance

SUB UNIT: Static Balance

MATERIAL: Tape (Guideline) 8' long

DATE: Tuesday, May 4, 1982

TASK (A):

Stork stand.

PREREQUISITE SKILLS:

Standing on one foot, hands on hips for five seconds.

PERFORMANCE OBJECTIVE:

Student stands on preferred foot on line 8' long, sole of other foot placed against calf of standing leg, eyes closed, arms stretched sideways, holds position for 5 seconds.

ENABLING OBJECTIVES:

1. Student stands on preferred foot on line 8' long, sole of other foot placed against calf of standing leg, arms stretched sideways, eyes open, holds position.

2. Student stands on preferred foot on line 8' long, sole of other foot placed against calf of standing leg, arms stretched sideways, eyes closed, holds position.

The following steps are to be used with objectives 1 and 2:

a. Time: 1 second.
b. Time: 3 seconds.
TASK (8):

kimbo stand.

PREREQUISITE SKILLS:

Standing on one foot with arms to side for five seconds.

PERFORMANCE OBJECTIVE:

Student stands tip toes on preferred foot on line 8' long, other touches floor in crossed leg position, arms stretched sideways, eyes closed, holds position for 15 seconds.

ENABLING OBJECTIVES:

1. Student stands on preferred foot on line 8' long, other touches floor in crossed leg position, arms stretched sideways, eyes closed, holds position.

2. Student stands on tip toes on preferred foot on line 8' long, other touches floor in crossed leg position, arms stretched sideways, eyes open, holds position.

3. Student stands tip toes on preferred foot on line 8' long, other touches floor in crossed leg position, arms stretched sideways, eyes closed, holds position.

The following steps are to be used with objectives 1-3:

a. Time: 5 seconds.
b. Time: 10 seconds.
c. Time: 15 seconds.
LESSON NO. (15)

UNIT: Balance  SUB UNIT: Dynamic Balance

MATERIAL: Tape (Guideline) 8’ long  DATE: Wednesday, May 5, 1982

TASK (A):

One leg balance reverse.

PREREQUISITE SKILLS:

One leg balance for five seconds.

PERFORMANCE OBJECTIVE:

Student assumes one leg balance position on line 8’ long, arms stretched sideways, swings free leg out to make 180° turn to the opposite direction without touching the floor, ends in starting position.

ENABLING OBJECTIVES:

1. Student bends forward and stands on preferred foot on line 8’ long, arms stretched sideways, other leg bent backward, repeat three times.

2. Student bends forward and stands on preferred foot on line 8’ long, arms stretched sideways, other leg held straight back parallel to floor, repeat three times.

3. Student assumes one leg balance position on line 8’ long, arms stretched sideways, swings free leg out to make 180° turn to the opposite direction without touching the floor, ends in starting position.
TASK ( B ):

Hopping forward on preferred leg, other leg held straight off floor.

PREREQUISITE SKILLS:

Walking forward on line.

PERFORMANCE OBJECTIVE:

Student hops forward on preferred leg on line 8' long, arms stretched sideways, other leg held straight off floor.

ENABLING OBJECTIVES:

1. Student hops forward on preferred leg on line 8' long, arms stretched sideways, other leg bent forward.

2. Student hops forward on preferred leg on line 8' long, arms stretched sideways, other leg bent backward.

3. Student hops forward on preferred leg on line 8' long, arms stretched sideways, other leg held straight off floor.
TASK (A):

180° turn on preferred side with eyes closed.

PREREQUISITE SKILLS:

Jumping up and landing on line.

PERFORMANCE OBJECTIVE:

Student jumps up to make 180° turn on preferred side, eyes closed, arms stretched over head during turn, lands with both feet on line 8' long.

ENABLING OBJECTIVES:

1. Student jumps up to make 90° turn on preferred side, eyes open, arms stretched over head during turn, lands with both feet on line 8' long.

2. Student jumps up to make 180° turn on preferred side, eyes open, arms stretched over head during turn, lands with both feet on line 8' long.

3. Student jumps up to make 180° turn on preferred side, eyes closed, arms stretched over head during turn, lands with both feet on line 8' long.
TASK (8):

180° turn alternating both sides with eyes open.

PREREQUISITE SKILLS:

Jumping up to make 90° turn on both sides.

PERFORMANCE OBJECTIVE:

Student jumps up to make 180° turn alternating both sides (left and right), eyes open, arms stretched over head during turn, lands with both feet on line 8' long.

ENABLING OBJECTIVES:

1. Student jumps up to make 180° turn to left side, eyes open, arms stretched over head during turn, lands with both feet on line 8' long.

2. Student jumps up to make 180° turn to right side, eyes open, arms stretched over head during turn, lands with both feet on line 8' long.

3. Student jumps up to make 180° turn alternating both sides (left and right), eyes open, arms stretched over head during turn, lands with both feet on line 8' long.
TASK (A):

Single knee balance.

PREREQUISITE SKILLS:

Balancing on four points (two hands and two knees).

PERFORMANCE OBJECTIVE:

Student balances on one knee with arms stretched sideways and other leg straight backward parallel to floor for 5 seconds.

ENABLING OBJECTIVES:

1. Student balances on three points (one knee and two hands), other leg straight backward parallel to floor.
2. Student balances on two points (one knee and one hand), other arm stretched sideways and other leg straight backward parallel to floor.
3. Student balances on one knee with arms stretched sideways and other leg straight backward parallel to floor.

The following steps are to be used with objectives 1-3:

a. Time: 2 seconds
b. Time: 3 seconds
c. Time: 5 seconds
TASK (B):

Squat head balance (tripod).

PREREQUISITE SKILLS:

Balancing on three points (one knee and two hands) for five seconds.

PERFORMANCE OBJECTIVE:

Student balances on three points (hands and forehead) with feet off the mat for 10 seconds.

ENABLING OBJECTIVES:

1. Student balances on five points (hands, feet and forehead).

2. Student balances on four points (hands, one foot, and forehead).

3. Student balances on three points (hands and forehead), raises the feet off the mat.

The following steps are to be used with objectives 1-3:

a. Time: 3 seconds
b. Time: 5 seconds
c. Time: 10 seconds
LESSON NO. (18)

UNIT: Balance  SUB UNIT: Static Balance

MATERIAL: Tumbling Mat  DATE: Tuesday, May 11, 1982

TASK (A):

Double knee up.

PREREQUISITE SKILLS:

Balancing on four points (hands, one foot and forehead) for five seconds.

PERFORMANCE OBJECTIVE:

Student balances on three points (hands and forehead) with both knees up for 10 seconds.

ENABLING OBJECTIVES:

1. Student balances on three points (hands and forehead) with both knees free off elbows.

2. Student balances on three points (hands and forehead) with one knee off elbow and the other above hips.

3. Student balances on three points (hands and forehead) with both knees up.

The following steps are to be used with objectives 1-3:

a. Time: 3 seconds
b. Time: 5 seconds
c. Time: 10 seconds
TASK (B):

Head stand balance.

PREREQUISITE SKILLS:

Squating head balance (tripod) for five seconds.

PERFORMANCE OBJECTIVE:

Student balances on forehead and hands with legs straight overhead and back neatly arched without assistance for 5 seconds.

ENABLING OBJECTIVES:

1. Student balances on forehead and hands with both knees up.

2. Student balances on forehead and hands with legs straight overhead and back neatly arched with assistance.

3. Student balances on forehead and hands with legs straight overhead and back neatly arched without assistance.

The following steps are to be used with objectives 1-3:

a. Time: 3 seconds
b. Time: 5 seconds
c. Time: 10 seconds
LESSON NO. (19)

UNIT: Balance

SUB UNIT: Dynamic Balance

MATERIAL: Bean Bag

DATE: Wednesday, May 12, 1982

TASK( A ):

Walking on tip toes with bean bag on head.

PREREQUISITE SKILLS:

Walking on line with eyes open.

PERFORMANCE OBJECTIVE:

Student walks tip toes backward on line 8' long, arms stretched sideways, holding a good posture, eyes open while balancing a bean bag on head.

ENABLING OBJECTIVES:

1. Student walks forward in normal steps on line 8' long, arms stretched sideways, holding a good posture, eyes open while balancing a bean bag on head.

2. Student walks tip toes forward on line 8' long, arms stretched sideways, holding a good posture, eyes open while balancing a bean bag on head.

3. Student walks tip toes backward on line 8' long, arms stretched sideways, holding a good posture, eyes open while balancing a bean bag on head.
TASK (8):
Walking on heels with bean bag on head.

PREREQUISITE SKILLS:
Walking on line with eyes open.

PERFORMANCE OBJECTIVE:
Student walks on heels backward on line 8' long, arms stretched sideways, holding a good posture, eyes open while balancing a bean bag on head.

ENABLING OBJECTIVES:

1. Student walks backward in normal steps on line 8' long, arms stretched sideways, holding a good posture, eyes open while balancing a bean bag on head.

2. Student walks forward on heels on line 8' long, arms stretched sideways, holding a good posture, eyes open while balancing a bean bag on head.

3. Student walks on heels backward on line 8' long, arms stretched sideways, holding a good posture, eyes open while balancing a bean bag on head.
LESSON NO. (20)

UNIT: Balance

SUB UNIT: Dynamic Balance

MATERIAL: Bean Bag

DATE: Thursday, May 13, 1982

TASK (A):

Walking tip toes with bean bag on forehead.

PREREQUISITE SKILLS:

Walking on line with eyes open.

PERFORMANCE OBJECTIVE:

Student walks tip toes forward on line 8' long, arms stretched sideways, holding a good posture, head tilted back with bean bag on forehead.

ENABLING OBJECTIVES:

1. Student walks forward in normal steps on line 8' long, arms stretched sideways, holding a good posture, head tilted back with bean bag on forehead.

2. Student walks tip toes forward on line 8' long, arms stretched sideways, holding a good posture, head tilted back with bean bag on forehead.
TASK (8):

Hopping on one foot with bean bag on top of other foot.

PREREQUISITE SKILLS:

Hopping alternately forward on one foot.

PERFORMANCE OBJECTIVE:

Student hops backward on preferred foot on line 8' long, bean bag placed on top of other foot.

ENABLING OBJECTIVES:

1. Student hops forward on preferred foot on line 8' long.

2. Student hops forward on preferred foot on line 8' long, bean bag placed on top of other foot.

3. Student hops backward on preferred foot on line 8' long, bean bag placed on top of other foot.
UNIT: Balance

LESSON NO. (21)

SUB UNIT: Static Balance

MATERIAL: Tumbling Mat

DATE: Monday, May 17, 1982

TASK (A):

V-sit balance.

PREREQUISITE SKILLS:

Holding a V-sit position with arms in cross chest position for five seconds.

PERFORMANCE OBJECTIVE:

Student sits on the mat with arms stretched sideways and legs straight up in V-sit position for 15 seconds.

ENABLING OBJECTIVES:

1. Student sits on the mat with arms stretched sideways and knees bent, feet on mat.

2. Student sits on the mat with arms stretched sideways and knees bent feet off mat.

3. Student sits on the mat with arms stretched sideways and legs straight up in V-sit position.

The following steps are to be used with objectives 1-3:

a. Time: 5 seconds
b. Time: 10 seconds
c. Time: 15 seconds
TASK (B):

Head and forearm balance.

PREREQUISITE SKILLS:

Head stand balance for three seconds.

PERFORMANCE OBJECTIVE:

Student balances on forehead and forearms with legs straight overhead and back neatly arched without assistance for 5 seconds.

ENABLING OBJECTIVES:

1. Student balances on forehead and forearms with both knees bent up.

2. Student balances on forehead and forearms with legs straight overhead and back neatly arched with assistance.

3. Student balances on forehead and forearms with legs straight overhead and back neatly arched without assistance.

The following steps are to be used with objectives 1-3:

a. Time: 3 seconds
b. Time: 5 seconds
c. Time: 10 seconds
LESSON NO. (22)

UNIT: Balance
SUB UNIT: Static Balance

MATERIAL: Tumbling Mat

DATE: Tuesday, May 18, 1982

TASK (A):

Squat hand balance (tip up).

PREREQUISITE SKILLS:

Squat head balance (tripod) for five seconds.

PERFORMANCE OBJECTIVE:

Student balances on hands with arms straight, hips over shoulders and knees bent without assistance for 3 seconds.

ENABLING OBJECTIVES:

1. Student balances on hands with arms straight and knees resting on the elbows.

2. Student balances on hands with arms straight, hips over shoulders and knees bent with assistance.

3. Student balances on hands with arms straight, hips over shoulders and knees bent without assistance.

The following steps are to be used with objectives 1-3:

a. Time: 1 second
b. Time: 2 seconds
c. Time: 3 seconds
TASK (B):

Hand stand balance.

PREREQUISITE SKILLS:

Head stand balance for three seconds.

PERFORMANCE OBJECTIVE:

Student balances on hands with arms and legs straight overhead and back neatly arched with assistance for 5 seconds.

ENABLING OBJECTIVES:

1. Student balances on hands with arms straight, kicks with one leg over head and other foot on mat, returns to starting position.

2. Student balances on hands with arms straight, kicks with one leg overhead followed by the other leg, returns back to starting position.

3. Student balances on hands with arms and legs straight overhead and back neatly arched with assistance for 5 seconds.
LESSON NO. (23)

UNIT: Balance
SUB UNIT: Dynamic Balance

MATERIAL: Spring Board
DATE: Wednesday, May 19, 1982

TASK (A):

Half turn-rebound-half turn.

PREREQUISITE SKILLS:

Bouncing off the floor for one-half turn (180°).

PERFORMANCE OBJECTIVE:

Student takes one or two steps and bounces off spring board. Before landing make ½ (180°) turn on preferred side. Upon landing rebound off mat and make another ½ turn in the same direction.

ENABLING OBJECTIVES:

1. Student takes one or two steps and bounces off spring board. Before landing make ½ turn (90°) on preferred side.

2. Student takes one or two steps and bounces off spring board. Before landing make ½ turn (180°) on preferred side.

3. Student takes one or two steps and bounces off spring board. Before landing make ½ turn (180°) on preferred side. Upon landing rebound off mat and make another ½ turn in the same direction.
TASK(8):

Full turn-rebound-full turn.

PREREQUISITE SKILLS:

Bouncing off the the floor for full turn (360°).

PERFORMANCE OBJECTIVE:

Student takes one or two steps and bounces off spring board. Before landing make full turn (360°) on preferred side. Upon landing rebound off mat and make another full turn in the same direction.

ENABLING OBJECTIVES:

1. Student takes one or two steps and bounces off spring board. Before landing make 3/4 turn (270°) on preferred side.

2. Student takes one or two steps and bounces off spring board. Before landing make full turn (360°) on preferred side.

3. Student takes one or two steps and bounces off spring board. Before landing make full turn (360°) on preferred side. Upon landing rebound off mat and make another full turn in the same direction.
UNIT: Balance             SUB UNIT: Dynamic Balance
MATERIAL: Spring Board    DATE: Thursday, May 20, 1982

TASK (A):
Tuck bounce to forward roll.

PREREQUISITE SKILLS:
Straight jump up on floor.

PERFORMANCE OBJECTIVE:
Student takes one or two steps and bounces off spring board, quickly grabs knees and pulls them up toward chest. After landing on feet bend knees and execute forward roll.

ENABLING OBJECTIVES:
1. Student takes one or two steps and bounces off spring board, finishes in landing position.

2. Student takes one or two steps and bounces off spring board, quickly grabs knees and pulls them toward chest, finishes in landing position.

3. Student takes one or two steps and bounces off spring board, quickly grabs knees and pulls them up toward chest. After landing on feet bend knees and execute forward roll.
TASK (B):

Jack knife to forward roll.

PREREQUISITE SKILLS:

Tuck bounce on floor.

PERFORMANCE OBJECTIVE:

Student takes one or two steps and bounces off spring board, quickly executes jack knife. After landing on feet, bend knees and execute forward roll.

ENABLING OBJECTIVES:

1. Student takes one or two steps and bounces off spring board, finishes in landing position.

2. Student takes one or two steps and bounces off spring board, quickly executes jack knife, finishes in landing position.

3. Student takes one or two steps and bounces off spring board, quickly executes jack knife. After landing on feet bend knees and execute forward roll.
LESSON NO. ( 25 )

UNIT: Balance

SUB UNIT: Static Balance

MATERIAL: Low Balance Beam

DATE: Monday, May 24, 1982

TASK (A):

knee lift balance.

PREREQUISITE SKILLS:

Standing on preferred foot on line for five seconds.

PERFORMANCE OBJECTIVE:

Student stands on preferred foot on balance beam (4" wide, 12' long, and 1' high), with arms stretched sideways, eyes closed for 10 seconds.

ENABLING OBJECTIVES:

1. Student stands with both feet on balance beam (4" wide, 12' long, 1' high), with arms stretched sideways, eyes open.

2. Student stands on preferred foot on balance beam (4" wide, 12' long, 1' high), with arms stretched sideways, eyes open.

3. Student stands on preferred foot on balance beam (4" wide, 12' long, 1' high), with arms stretched sideways, eyes closed.

The following steps are to be used with objectives 1-3:

a. Time: 3 seconds
b. Time: 5 seconds
c. Time: 10 seconds
TASK(8):

Stork stand.

PREREQUISITE SKILLS:

Standing on preferred foot on line for five seconds.

PERFORMANCE OBJECTIVE:

Student stands on preferred leg, the sole of the other foot placed against the calf of the standing leg, on balance beam (4" wide, 12' long, 1' high), with arms stretched sideways, eyes closed, holds the position for 10 seconds.

ENABLING OBJECTIVES:

1. Student stands with both feet on balance beam (4" wide, 12' long, 1' high), with arms stretched sideways, eyes open.

2. Student stands on preferred leg, the sole of the other foot placed against the calf of the standing leg, on balance beam (4" wide, 12' long, 1' high), with arms stretched sideways, eyes open, hold the position.

3. Student stands on preferred leg, the sole of the other foot placed against the calf of the standing leg, on balance beam (4" wide, 12' long, 1' high), with arms stretched sideways, eyes closed, hold the position.

The following steps are to be used with objectives 1-3:

a. Time: 3 seconds
b. Time: 5 seconds
c. Time: 10 seconds
LESSON NO. (26)

UNIT: Balance
SUB UNIT: Static Balance

MATERIAL: Low Balance Beam
DATE: Tuesday, May 25, 1982

TASK (A):

Single leg balance.

PREREQUISITE SKILLS:

Standing tip toes on preferred leg on floor with arms stretched sideways and other leg bent forward for five seconds.

PERFORMANCE OBJECTIVE:

Student stands on preferred leg on balance beam (4" wide, 12' long and 1' high) with arms stretched forward and other leg straight backward parallel to the beam for 10 seconds.

ENABLING OBJECTIVES:

1. Student stands tip toes on preferred leg on balance beam (4" wide, 12' long and 1' high) with other knee bent forward and the arms stretched sideways.

2. Student stands on preferred leg on balance beam (4" wide, 12' long, and 1' high) with arms stretched forward and other leg bent backward parallel to the beam.

3. Student stands on preferred leg on balance beam (4" wide, 12' long, and 1' high) arms stretched forward and other leg straight backward parallel to the beam.

The following steps are to be used with objectives 1-3:

a. Time: 3 seconds
b. Time: 5 seconds
c. Time: 10 seconds
TASK (8):

Seat balance.

PREREQUISITE SKILLS:

Holding a V-sit position on the floor for five seconds.

PERFORMANCE OBJECTIVE:

Student sits on the balance beam (4" wide, 12' long and 1' high) in V-sit position with legs up and arms stretched sideways for 15 seconds.

ENABLING OBJECTIVES:

1. Student sits on balance beam (4" wide, 12' long, and 1' high) in squat position with feet off the beam, grasps the beam with both hands.

2. Student sits on balance beam (4" wide, 12' long, and 1' high) in squat position with feet off the beam, stretches the arms sideways.

3. Student sits on balance beam (4" wide, 12' long, and 1' high) in V-sit position with legs up and arms stretched sideways.

The following steps are to be used with objectives 1-3:

a. Time: 5 seconds
b. Time: 10 seconds
c. Time: 15 seconds
LESSON NO. ( 27 )

UNIT: Balance  SUB UNIT: Dynamic Balance
MATERIAL: Low Balance Beam  DATE: Wednesday, May 26, 1982

TASK ( A ):

Walking forward tip toes with bean bag on head.

PREREQUISITE SKILLS:

Walking tip toes on line 8' long with eyes open.

PERFORMANCE OBJECTIVE:

Student walks forward tip toes on balance beam (4' wide, 12' long, 1' high), arms stretched sideways, with a good posture, eyes open while balancing a bean bag on top of the head.

ENABLING OBJECTIVES:

1. Student walks forward in normal steps on balance beam (4' wide, 12' long, 1' high), arms stretched sideways, with a good posture, eyes open.

2. Student walks forward tip toes on balance beam (4' wide, 12' long, 1' high), arms stretched sideways, with a good posture, eyes open.

3. Student walks forward tip toes on balance beam (4' wide, 12' long, 1' high), arms stretched sideways, with a good posture, eyes open while balancing a bean bag on top of head.
TASK ( B ):

Walking forward on heels with bean bag on head.

PREREQUISITE SKILLS:

Walking on heels on line 8' long with eyes open.

PERFORMANCE OBJECTIVE:

Student walks forward on heels on balance beam (4" wide, 12' long, 1' high), arms stretched sideways, with a good posture, eyes open while balancing a bean bag on top of the head.

ENABLING OBJECTIVES:

1. Student walks forward in normal steps on balance beam (4" wide, 12' long, 1' high), arms stretched sideways, with a good posture, eyes open.

2. Student walks forward on heels on balance beam (4" wide, 12' long, 1' high), arms stretched sideways, with a good posture, eyes open.

3. Student walks forward on heels on balance beam (4" wide, 12' long, 1' high), arms stretched sideways, with a good posture, eyes open while balancing a bean bag on top of the head.
LESSON NO. (28)

UNIT: Balance

SUB UNIT: Dynamic Balance

MATERIAL: Low Balance Beam - Rubber Ball - Bean Bag

DATE: Thursday, May 27, 1982

TASK (A):

Rolling a rubber ball on balance beam.

PREREQUISITE SKILLS:

Walking on four points on line 8' long.

PERFORMANCE OBJECTIVE:

Student rolls a rubber ball on a balance beam (4" wide, 12' long, 1' high), with knees straight.

ENABLING OBJECTIVES:

1. Student walks forward on four points (hands and feet) on balance beam (4" wide, 12' long, 1' high), with knees bent.

2. Student rolls a rubber ball on a balance beam (4" wide, 12' long, 1' high), with knees bent.

3. Student rolls a rubber ball on a balance beam (4" wide, 12' long, 1' high), with knees straight.
TASK (B):

Walking forward on balance beam while circling a rubber ball around the hips.

PREREQUISITE SKILLS:

Walking forward on balance beam.

PERFORMANCE OBJECTIVE:

Student walks forward on balance beam (4" wide, 12' long, 1' high), while circling a rubber ball around the hips and balancing a bean bag on top of the head, eyes closed.

ENABLING OBJECTIVES:

1. Student walks forward on balance beam (4" wide, 12' long 1' high), while circling a rubber ball around the hips, eyes open.

2. Student walks forward on balance beam (4" wide, 12' long 1' high), while circling a rubber ball around the waist and balancing a bean bag on top of the head, eyes open.

3. Student walks forward on balance beam (4" wide, 12' long 1' high), while circling a rubber ball around the hips and balancing a bean bag on top of the head, eyes closed.
UNIT: Balance  SUB UNIT: Static Balance


TASK (A):

Standing tip toes with bean bag on head.

PREREQUISITE SKILLS:

Standing tip toes on line for five seconds.

PERFORMANCE OBJECTIVE:

Student stands tip toes on balance beam (4" wide 12' long, 4' high), with one foot in front of the other and hands placed on hips, bean bag on top of the head, eyes closed for 5 seconds.

ENABLING OBJECTIVES:

1. Student stands tip toes on balance beam (4" wide, 12' long, 4' high), with one foot in front of the other and hands placed on hips, eyes open.

2. Student stands tip toes on balance beam (4" wide, 12' long, 4' high), with one foot in front of the other and hands placed on hips, bean bag on top of the head, eyes open.

3. Student stands tip toes on balance beam (4" wide, 12' long, 4' high), with one foot in front of the other and hands placed on hips, bean bag on top of the head, eyes closed.

The following steps are to be used with objectives 1-3:

a. Time: 2 seconds
b. Time: 3 seconds
c. Time: 5 seconds
TASK(8):

kimbo stand.

PREREQUISITE SKILLS:

Standing with legs in crossed position on line.

PERFORMANCE OBJECTIVE:

Student stands tip toes on balance beam (4" wide, 12' long, 4' high), with legs in crossed position, arms stretched sideways, eyes closed for 5 seconds.

ENABLING OBJECTIVES:

1. Student stands on balance beam (4" wide, 12' long, 4' high), with legs in crossed position, arms stretched sideways, eyes open.

2. Student stands tip toes on balance beam (4" wide, 12' long, 4' high), with legs in crossed position, arms stretched sideways, eyes open.

3. Student stands tip toes on balance beam (4" wide, 12' long, 4' high), with legs in crossed position, arms stretched sideways, eyes closed.

The following steps are to be used with objectives 1-3:

a. Time: 2 seconds
b. Time: 3 seconds
c. Time: 5 seconds
LESSON NO. (30)

UNIT: Balance
SUB UNIT: Static Balance

MATERIAL: High Balance Beam – Bean Bag

DATE: Tuesday, June 1, 1982

TASK (A):

Foot and knee balance.

PREREQUISITE SKILLS:

Foot and knee balance on line.

PERFORMANCE OBJECTIVE:

Student balances on one knee and foot with other leg extended straight forward on balance beam (4" wide, 12' long, 4' high), arms stretched sideways, bean bag on top of head for 10 seconds.

ENABLING OBJECTIVES:

1. Student balances on one knee and foot on balance beam (4" wide, 12' long, 4' high), arms stretched sideways.

2. Student balances on one knee and foot on balance beam (4" wide, 12' long, 4' high), arms stretched sideways, bean bag on top of head.

3. Student balances on one knee and foot with other leg extended straight forward on balance beam (4" wide, 12' long, 4' high), arms stretched sideways, bean bag on top of head.

The following steps are to be used with objectives 1-3.

a. Time: 3 seconds
b. Time: 5 seconds
c. Time: 10 seconds
TASK( 6 ):

One foot balance with bean bag on head.

PREREQUISITE SKILLS:

Standing on one foot on a line with eyes open.

PERFORMANCE OBJECTIVE:

Student stands on preferred foot on balance beam (4" wide, 12' long, 4' high), one arm stretched forward and the other grasps the free foot from the back, balances a bean bag on top of head for 15 seconds.

ENABLING OBJECTIVES:

1. Student squats on preferred leg, with other leg extended straight forward on balance beam (4" wide, 12' long, 4' high), arms stretched sideways, balances a bean bag on top of head.

2. Student stands on preferred foot, with other leg bent backward on balance beam (4" wide, 12' long, 4' high), arms stretched sideways, balances a bean bag on top of head.

3. Student stands on preferred foot on balance beam (4" wide, 12' long, 4' high), one arm stretched forward and the other grasps the free foot from the back, balances bean bag on top of head.

The following steps are to be used with objectives 1-3:

a. Time: 5 seconds
b. Time: 10 seconds
c. Time: 15 seconds
UNIT: Balance
SUB UNIT: Dynamic Balance

MATERIAL: High Balance Beam
Rubber Ball

DATE: Wednesday, June 2, 1982

TASK (A):
Walking, throwing and catching a ball.

PREREQUISITE SKILLS:
Walking, throwing and catching a ball on line on floor.

PERFORMANCE OBJECTIVE:
Student walks backwards throwing and catching a ball, on balance beam (4" wide, 12' long, 4' high).

ENABLING OBJECTIVES:
1. Student walks forward on balance beam (4" wide, 12' long, 4' high), arms stretched sideways, with a good posture.

2. Student walks forward throwing and catching a ball, on balance beam (4" wide, 12' long, 4' high).

3. Student walks backwards throwing and catching a ball, on balance beam (4" wide, 12' long, 4' high).
TASK( 8 ):

Hop - shift and landing on balance beam - ball held in front of chest.

PREREQUISITE SKILLS:

Jumping up and landing on line on floor with one foot in front of the other.

PERFORMANCE OBJECTIVE:

Student stands on balance beam (4" wide, 12' long, 4' high), with a ball in front of the chest, one foot in front of the other, jumps up enough to quickly shift places with feet and lands on the beam.

ENABLING OBJECTIVES:

1. Student stands on balance beam (4" wide, 12' long, 4' high), with a ball in front of the chest, one foot in front of the other, jumps up and lands on the beam in the same position.

2. Student stands on balance beam (4" wide, 12' long, 4' high), with arms stretched sideways, one foot in front of the other, jumps up enough to quickly shift places with feet and lands on the beam.

3. Student stands on balance beam (4" wide, 12' long, 4' high), with a ball in front of the chest, one foot in front of the other, jumps up enough to quickly shift places with feet and lands on the beam.
UNIT: Balance
SUB UNIT: Dynamic Balance

MATERIAL: Slanted Balance Beam
Rubber Ball - Bean Bag

DATE: Thursday, June 3, 1982

LESSON NO. (32)

TASK (A):
Rolling rubber ball on slanted balance beam.

PREREQUISITE SKILLS:
Walking and rolling a ball on balance beam one foot high.

PERFORMANCE OBJECTIVE:
Student rolls rubber ball up and down with both hands, knees are bent, on slanted balance beam (4" wide, 12' long, slanted 4' high).

ENABLING OBJECTIVES:
1. Student walks up and down with arms stretched sideways, on slanted balance beam (4" wide, 12' long, slanted 4' high).
2. Student walks up and down on four points, (hand and feet), knees bent, on slanted balance beam (4" wide, 12' long, slanted 4' high).
3. Student rolls rubber ball up and down with both hands, knees are bent, on slanted balance beam (4" wide, 12' long, slanted 4' high).
TASK (B):

Walking on slanted balance beam, circling a rubber ball around the hips.

PREREQUISITE SKILLS:

Walking forward on a balance beam.

PERFORMANCE OBJECTIVE:

Student walks up and down, circling a rubber ball around the hips, balancing a bean bag on top of head, on a slanted balance beam (4" wide, 12' long, slanted 4' high).

ENABLING OBJECTIVES:

1. Student walks up and down holding a rubber ball on slanted balance beam (4" wide, 12' long, slanted 4' high).

2. Student walks up and down, circling a rubber ball around the hips, on a slanted balance beam (4" wide, 12' long, slanted 4' high).

3. Student walks up and down, circling a rubber ball around the hips, balancing a bean bag on top of head, on a slanted balance beam (4" wide, 12' long, slanted 4' high).
APPENDIX F

SAMPLE OF
DAILY CLASS PERFORMANCE SCORING SHEET
## ENABLING OBJECTIVES

### Performance Objective

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<th>Performance Objective</th>
<th>Objective</th>
<th>Notes</th>
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<tr>
<td>B. Walking on heels on line 8' long.</td>
<td>2</td>
<td>walks forward - eyes closed.</td>
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<tr>
<td>B. Walking on heels - bag on head.</td>
<td>3</td>
<td>walks forward - bag on head.</td>
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### SUBJECTS

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### SCORING

- **X** - Achieved
- **0** - Not Achieved
APPENDIX G

SAMPLE OF
WEEKLY INDIVIDUAL SCORING SHEET
## SAMPLE OF WEEKLY INDIVIDUAL SCORING SHEET

### WEEK NO. (1)

**SUBJECT NO:**

**TIME PERIOD:** April 12 - 15, 1982

<table>
<thead>
<tr>
<th>LESSON</th>
<th>PERFORMANCE OBJECTIVES</th>
<th>ENABLING OBJECTIVES</th>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thur</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>DYNAMIC BALANCE LINE</td>
<td>A. Walking tip toes on line 8' long.</td>
<td>1. Tip toes forward-eyes open.</td>
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<td>2. Tip toes forward-eyes closed.</td>
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<td>3. Tip toes forward-bag on head.</td>
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<tr>
<td></td>
<td>B. Walking on heels on line 8' long.</td>
<td>1. Heels-eyes open.</td>
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<td>2. Heels-eyes closed.</td>
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<td>3. Heels-bag on head.</td>
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<td>2.</td>
<td>DYNAMIC BALANCE LINE</td>
<td>A. Hopping alternately on line 8' long.</td>
<td>1. Hopping alternately-in place.</td>
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<tr>
<td></td>
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<td>2. Hopping alternately-forward.</td>
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<td>3. Hopping alternately-backward.</td>
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<td></td>
<td>B. Walking sideways with crossover step on line 8' long.</td>
<td>1. In front of lead leg.</td>
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<td></td>
<td>2. Behind lead leg.</td>
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<td>3. In front of and behind lead leg.</td>
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<tr>
<td>3.</td>
<td>DYNAMIC BALANCE LINE</td>
<td>A. Hop shift and landing on line.</td>
<td>1. Feet apart on line-jump up.</td>
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<td>Feet apart on line-jump up, shift feet.</td>
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<td></td>
<td>Jump up-arms stretched sideways-shift feet.</td>
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<td>B. Double lame dog walk on line 8' long.</td>
<td>1. Moving on three points.</td>
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<td>2. Two points-cross lateral.</td>
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<td>3. Two points-bilateral.</td>
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<td>4.</td>
<td>DYNAMIC BALANCE LINE</td>
<td>A. Wicket walk sideways on line 8' long.</td>
<td>Walking on four points-1. knees bent.</td>
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<tr>
<td></td>
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<td>The knees straight-truck forward.</td>
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<td></td>
<td></td>
<td>The knees straight-grasp the ankles.</td>
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<td></td>
<td>B. Duck walk on line 8' long.</td>
<td>Hands on hips-walking toe 1. to heel.</td>
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<td>Hands on hips-knees half 1. squat.</td>
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<td>Arms to side-knees half 3. squat.</td>
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### SCORING

- **X** - Achieved
- **0** - Not Achieved
APPENDIX H

RAW DATA
RAW DATA FORMAT

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<td>Static (pre-test)</td>
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<td>6 - 7</td>
<td>Dynamic (pre-test)</td>
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<td>8 - 9</td>
<td>Static (post-test)</td>
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<td>10 - 11</td>
<td>Dynamic (post-test)</td>
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RAW DATA

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21 5 12 13 09 12  
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21 7 11 14 09 15