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A posture program at the high school level

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A THESIS SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE
M.A. DEGREE AT THE

by

Alex Maxwell McLain

A Thesis

Presented to the

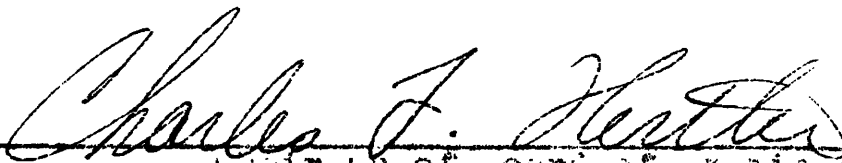
Faculty of the Department of Health and Physical Education
University of Montana

June 1943

In Partial Fulfillment

of the Requirements for the Degree
Master of Arts

APPROVED:



Chairman of Board of Examiners



Chairman of Graduate Committee

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TABLE OF CONTENTS

CHAPTER	PAGE
PREFACE	
I. THE PROBLEM	1
Statement of the problem	1
Importance of the problem	1
II. GOOD POSTURE	8
Definition of good posture	8
Value of good posture.	9
III. EQUIPMENT AND FACILITIES	12
Screening equipment	12
Environment and facilities	15
IV. PROCEDURE	20
Lateral view	23
Anterior view	27
Posterior view	30
V. DETERMINING A NEED	35
VI. TREATMENT CONDUCTIVE TO NORMAL POSTURE	56
General posture exercises	57
Specific posture exercises	61
VII. CONCLUSIONS AND RECOMMENDATIONS	86
BIBLIOGRAPHY	88

LIST OF TABLES AND FIGURES

PAGE

1. Posture Silhouette Photographs, Department of Physical Education, University of South- ern California	6
2. Photographs of Good Posture	7
3. Photographs Showing How to Use Screening Equip- ment	17
4. Illustrations of the Posture Screen and the Foot-board	18
5. Posture Work Sheet	19
6. Photographs of Posture Deviations Found in Missoula County High School	36-49
7. Composite List of Deviations	50
8. Graph Showing the Number of Posture Deviations in the Freshman Class at Missoula County High School	51
9. Graph Showing the Number of Posture Deviations in the Sophomore Class at Missoula County High School	52
10. Photographs of Supplementary Deviations	54-55
11. Photographs of Exercises Used in the Treat- ment of Specific Deviations	64-75

LIST OF TABLES AND FIGURES (CONTINUED)

PAGE

12.	Tables Showing the Number of Students with Posture Deviations after Instruction	76-82
13.	Composite List of Deviations Before and after Treatment	83
14.	Graph Showing Total Deviations Before and after Treatment	84

PREPARE

During the period from September, 1942 to April, 1943, the author had the privilege of serving as a Military and Athletic Officer at the United States Navy Air-flight School, St. Mary's College, California. In this interval, he assisted in developing thousands of Naval Aviation Cadets to a degree of physical fitness and mental alertness seldom surpassed in history.

In order to obtain the physical perfection required of each Cadet, good mechanical use of the body was a must. It was apparent that many of these Cadets had never received instruction in the fundamentals, or the value, of good posture prior to their induction into the Service. After observing the Cadets during a four to six month period, the splendid results noted at the duration of their training were remarkably impressive. The improved posture, physical abilities and general appearance of these young men were definite proofs of the value of a posture program. At that time, it was evident to the writer that a posture program should be an integral part of the physical education program of every elementary and secondary school in the nation.

Because of this experience, he was inspired to select his thesis subject, hoping that the information

contained therein, would serve as an incentive and guide to school officials, in dealing with this important problem.

Through the courtesy and cooperation of Mr. H. D. Beary, and Mr. Walter Griffin, Principal and Director of Physical Education, respectively, Missoula County High School, Missoula, Montana, this research was made possible. The author wishes to express his appreciation to them, and to the members of the Freshmen and Sophomore Classes, Missoula County High School, who participated in the survey. He is also indebted to Mr. Charles E. Hertler and Mr. Vincent Wilson of the Department of Health and Physical Education, Montana State University, for their guidance and assistance.

CHAPTER I

THE PROBLEM

Statement of the Problem. "A Posture Program at the High School Level."

It has been the purpose of this research to make a study of the posture problem in Missoula County High School. The following objectives were set forth and served as a guide during this study: (1) determine a need for a posture correction program, by conducting a survey of the male students in the Freshman and Sophomore Classes in Missoula County High School, (2) determine simple and efficient screening techniques, which can be used in the recognition of posture deviations, (3) endeavor to evaluate the results of standard corrective exercises in the treatment of posture deviations, and, (4) instill a wholesome mental attitude toward good posture by stimulating interest of students, parents, and faculty members in the importance of good posture, and the correction of posture deviations.

Importance of the Problem. From time immemorial, mankind has struggled for existence against the elements, wild animals, pestilence and the common enemy, his fellow-man. The determining factor in his ability to cope with his environment, has rested largely upon the individual's

own physical prowess, mental alertness, and general well-being.

During the era of Grecian supremacy, the importance of physical fitness was apparent. Physical pursuits and sports took precedence over most other forms of education. Similar emphasis has been placed on physical fitness in other nations during their recognition as a world power. Perhaps the most recent example of the application of this philosophy, was Germany, whose physical preparedness program was almost as renowned as the Luftwaffe and the Panzer Divisions.

It is universally accepted today that good posture is essential to good physical condition. Stafford says, "correct body mechanics is a means of increasing organic efficiency of the body."¹ An individual with impaired organic efficiency, whether it be caused by poor posture, disease, or any other reason, cannot be expected to excel physically. It is, therefore, safe to assume that without good posture, physical excellence is more difficult to achieve.

¹ George T. Stafford, Preventive and Corrective Physical Education (New York: A. S. Barnes and Company, 1928), p. 60

Most of our American boys and girls of school age have been commanded by their parents or teachers, to "stand up straight", "throw your shoulders back", or "stop slouching." This indicates that the parent and the teacher are aware a posture problem exists. Unfortunately, the commands cited above, are about the only instruction the average American youth ever receives in good posture. Louisa C. Lippitt, a noted authority on posture, says:

It is a source of unending surprise to those who work in universities that so many students are allowed to reach the university age with their bodies in poor postural condition. Even when a student has come from a school where attention is given to sports and exercises, there has been, in almost every case, no instruction as to posture, or even as to correct standing position.²

Examinations indicate that only a small percentage of American youth has excellent mechanical use of the body. In the results of a survey made of the Freshman Class at Harvard University in 1926, Lowman found that out of 758 students examined, only 2.64 per cent had excellent mechanical use of the body, 20.84 per cent had good mechanical use of the body, 49.87 per cent had poor mechanical use of the body, and 26.65 per cent had very poor mechanical use of the body.³ Lowman also found

² Louisa C. Lippitt, A Manual of Corrective Gymnastics (New York: The Macmillan Company, 1923), p. 49

³ Charles Lowman, Claire Cloestock and Hazel Cooper, Corrective Physical Education for Groups (New York: A. S. Barnes and Company, 1930), p. 4

that only 43.40 per cent of the Freshman Class, which entered the University of Illinois in 1927, had normal feet.⁴ The same survey showed that out of 1940 students examined, only 171 had normal spines. Dr. Lloyd T. Brown, in his study of over 700 men at Harvard University, said, "30 per cent of the group stood in either the C or D (poor or very poor) class of posture, while only 20 per cent of this selected group of educated men, stood with their bodies in a normal or nearly normal position."⁵

It is a common practice among the disinterested and untrained, to believe that the student will outgrow posture deviations. Fortunately, many mild cases of posture deviations are outgrown, while on the other hand, mild cases may develop into very bad ones, if they are not corrected when the student is young and still growing. Doctors are continually receiving adults

⁴ Charles Lowman, Claire Colestock and Hazel Cooper, Corrective Physical Education for Groups (New York: A. S. Barnes and Company, 1930), p. 4

⁵ Lillian Curtis Drew, Individual Gymnastics (Philadelphia: Lea & Febiger, 1945), p. 60

who are complaining of back aches, leg and foot aches, sciatica, and many other forms of body ailments, which can be traced to poor body alignment.

University of Southern California

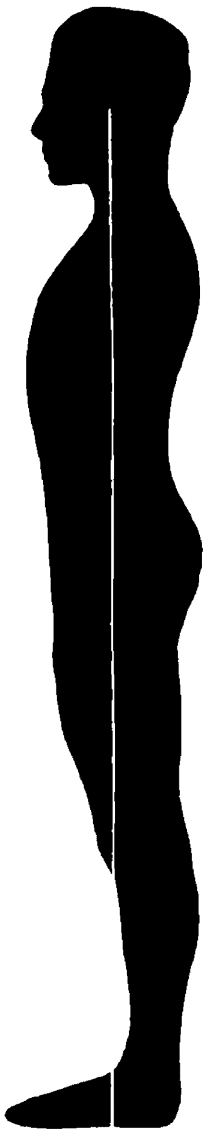
DEPARTMENT OF PHYSICAL EDUCATION

POSTURE SILHOUETTE PHOTOGRAPHS

(Part of Entering Physical Examination)

NOTE STRAIGHT AND ZIGZAG POSTURE LINES

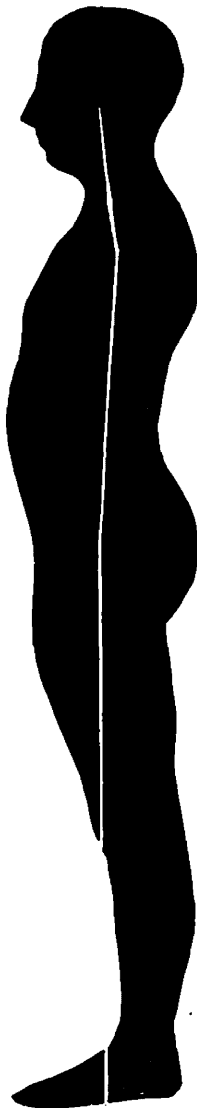
A



GOOD

1. Head, trunk and thigh in straight line.
2. Chest high, and forward.
3. Abdomen flat.
4. Back curves normal.

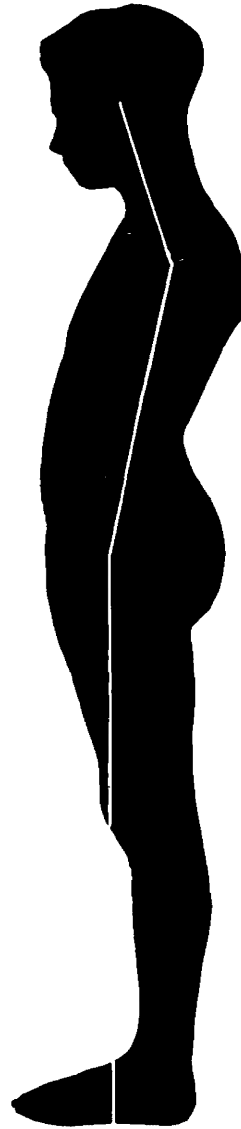
B



FAIR

1. Head forward.
2. Abdomen prominent.
3. Exaggerated curve in upper back.
4. Slight hollow back.

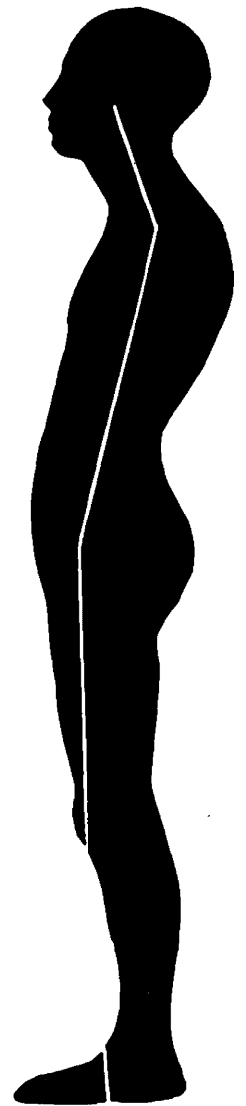
C



POOR

1. Relaxed (fatigue) posture.
2. Head forward.
3. Abdomen relaxed.
4. Shoulder blades prominent.
5. Hollow back.

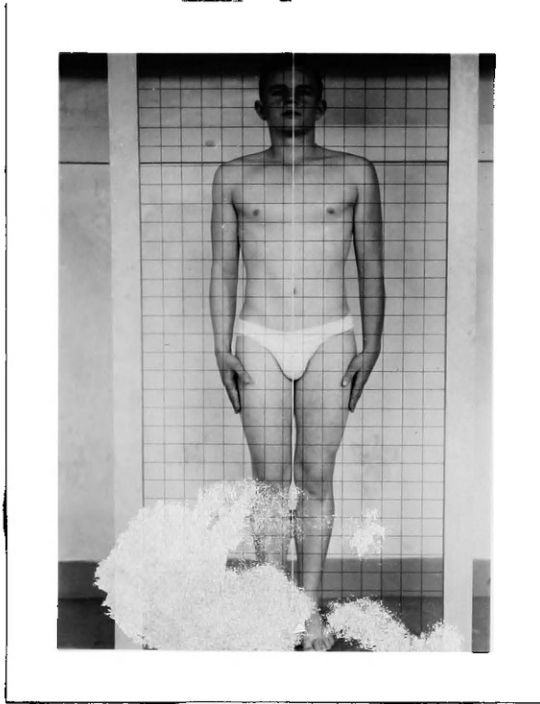
D



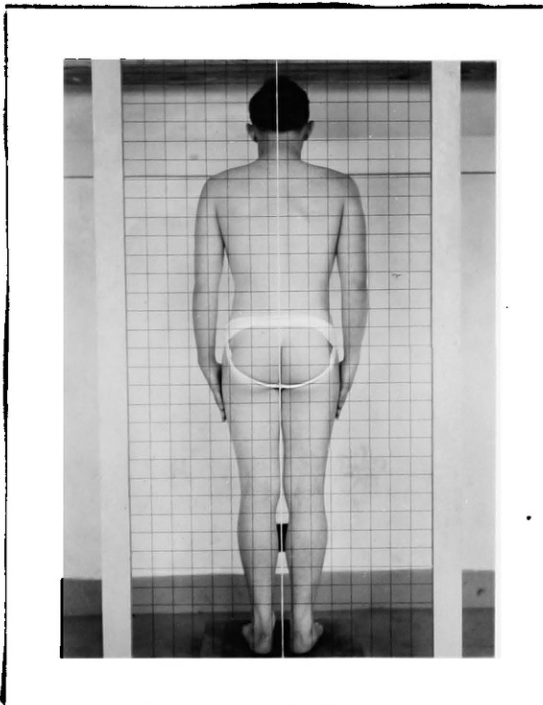
VERY POOR

1. Head forward badly.
2. Very exaggerated curve upper back.
3. Abdomen relaxed.
4. Chest flat-sloping.
5. Hollow back.

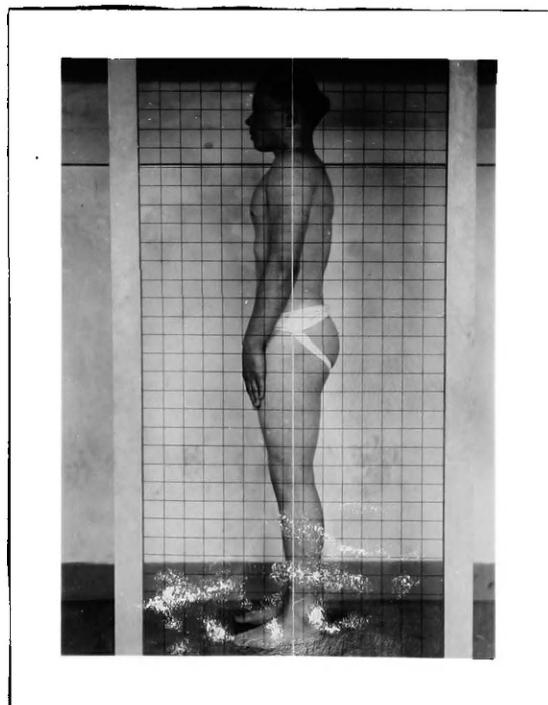
GOOD POSTURE



Anterior View



Posterior View



Lateral View

CHAPTER II

GOOD POSTURE

Definition. Good posture is the alignment of the head, shoulders, pelvis and feet, about a vertical axis. It is a position of body balance which is maintained with a minimum expenditure of energy. "Good posture may be defined as that position which enables the body to function to the best advantage as regards work done, health and appearance."⁶

The alignment of the body segments should be arranged around a vertical axis in such a manner that the body would maintain its erect position with a minimum use of muscular energy. Drew offers the following information relative to body balance and good posture:

As the body weight is supported on the lower extremities, then if the axes of the body segments, the head, trunk and legs are in such relation to one another that they approximate a straight line, it is obvious that such weight would be supported in the most economic way and balance would be preserved with the least resistance to gravitational forces. If, on the other hand these segments form a series of angles with one another, thus falling out of alignment with the center and line of gravity, the weight distribution is changed; and the body is in a less advantageous position for its activity.⁷

⁶ Whitelaw Morrison and Laurence Chenoweth, Physical Diagnosis (Philadelphia: Lea & Febiger, 1928), p. 99

⁷ Lillian Curtis Drew, Individual Gymnastics (Philadelphia: Lea & Febiger, 1945), p. 37

Fundamentally, sitting posture is the same as standing posture, except the weight is supported on the ischial tubercles of the innominate bones instead of being supported on the balls of the feet.

The same general body alignment is maintained in walking, as in standing.

The feet should point straight ahead and the weight carried largely on the outside of the feet, the heels touching the floor first, with the accent being forward and upward, the body inclined slightly forward and the arms swinging easily at the side . . . the body should appear to be lifted up and carried forward lightly with a sense of firmness in the muscles of the abdomen.⁸

Value of Good Posture. Correct posture has not been decided upon arbitrarily by authorities. The basis for their determination of correct posture is their observation of the effect of different types of posture on the health, the strength, and the ability to be active. The posture recommended as good, has proved its value in many ways.

Good posture favors the functioning of the body systems with the minimum amount of energy and the highest degree of efficiency. When the organs of the body are in their proper positions, there is greater efficiency for normal function.

⁸ Florence L. Meredith, The Health of Youth (Philadelphia: P. Glakiston's Son & Company, 1926), P. 159

Stafford offers the following information concerning the relationship between good health and good posture:

If the anatomical integrity of the erect position is preserved, the functional efficiency of the organs is as near normal as mechanical arrangement in the erect position will allow it to be. In the well-poised body, the head is erect; the antero-posterior depth of the chest is as great as is possible without strain; the thoracic cavity is sufficiently large to allow the lungs and the heart to function efficiently; the diaphragm is high and deep excursions of this muscle are possible. the liver is well supported by its ligamentous attachment to the diaphragm, the kidneys are well supported by their respective shelves of retro-peritoneal fat, muscles and fascia; the flat abdomen gives good support of the abdominal organs which lie directly posterior to the anterior abdominal wall; and the normal physiological curves are not exaggerated.⁹

In the well-poised body, all the organs are held in the best position for the proper performance of their functions. The chest is expanded, giving room for the lungs and heart, and thus the important processes of respiration and circulation can be carried on normally. There is no crowding of the stomach and liver, while the retraction of the abdominal walls supports the enclosed viscera in their elevated and natural relations.¹⁰

Any departure from the vertical requires muscular

⁹ George T. Stafford, Preventive and Corrective Physical Education (New York: A. S. Barnes and Company, 1928), p. 90

¹⁰ Lillian Curtis Drew, Individual Gymnastics (Philadelphia: Lea & Febiger, 1945), p. 45

energy to keep the jointed structure erect. This abnormal strain on the muscles, joints and ligaments, results in fatigue. This, in turn, is an influencing factor in producing poor posture.

The person possessing good posture, because of increased vigor and efficiency resulting from good health, is apt to lose less time from work and to have less expense for medical care than the person with poor posture. Since good posture creates an attitude of self-confidence, and enhances the appearance of the individual, it is, therefore, of importance to the person who is seeking employment, or who is being considered for advancement in position. It helps to produce a mentally cheerful and alert attitude, and increases courage, confidence and optimism. The person with good posture, graceful and well-poised, is more socially acceptable than the ungainly, graceless "sloucher". This does not necessarily mean that a person with poor posture will be a social outcast, but the pleasing appearance of a man, or woman, young, or old, is appealing to all.

CHAPTER III

EQUIPMENT AND FACILITIES

The use of simple equipment was one of the objectives of this research. Elaborate and technical equipment should be avoided.

The entire posture program will be new to most of the students, and awe-inspiring equipment and devices might tend to scare away many students who would otherwise accept the corrective program.¹¹ Since the corrective program will have to be sold to the school authorities, it is advisable to begin with the most simple and inexpensive equipment and apparatus.

Screening Equipment. Many types of screening equipment have been used from time to time, to detect posture deviations. In Crompton's "Front Wall Test", the student is required to stand facing the wall, with his toes touching, nose one inch from the wall, and hands placed in front of the thighs. A distance the width of the hand must be maintained between the thighs and the wall. In his "Back wall Test", the student stands with his heels,

¹¹ George T. Stafford, Inventive and Corrective Physical Education (New York: W. S. Barnes and Company, 1923), p. 108

hips, and shoulders against the wall. He then slides his hand in the space between the wall and his lumbar spine. These tests combine the very satisfactory features of testing posture and posture training in one procedure.¹²

The Schematograph is an apparatus by which the form of the student is recorded on a piece of tracing paper. The Silhouettegraph, where a photograph is taken producing a profile silhouette, is an improvement over the Schematograph.¹³ Both of these pieces of equipment are quite satisfactory, but require elaborate installation and considerable expense.

The following equipment was used in this research, and is recommended as adequate to conduct the screening for posture deviations:

1. Plumb-line. This piece of equipment can be used wherever there is a place to support it. A plumb-line is a suspended line with a metal weight attached to one end, and is used to determine a perpendicular.

2. Posture Screen. This apparatus was used to do most of the screening referred to in this research. It is valuable, in that it enables the examiner to determine at a glance, the segmental and symmetrical alignment of the

¹² George T. Stafford, Preventive and Corrective Physical Education (New York: W. B. Barnes and Company, 1923), p. 103

¹³ Loc. cit.

body. A string of contrasting color was used to divide the screen vertically, and served as the verticle axis, or gravity line. The intersecting squares, made by the cross strings, are two inches apart and make judgement more accurate and consistent. A diagram of the posture screen appears on page seventeen, and a photograph of the screen in use, on page eighteen.

3. Foot-board. A platform eighteen inches square and six inches high, was used for the student to stand upon while being examined. The foot-board enables the examiner to get a good view of the feet and ankles. another advantage of using the foot-board is, that the student will know what positions to take when he first steps upon the platform. A diagram of the foot-board can be found on page seventeen, and a photograph of this equipment in use, on page eighteen.

4. Check List. The examiner can improvise his own check list. A sample of the check list used in this research, is shown on page nineteen. The one used was designed so that follow-up examinations could be made. Instructions for using this form appear at the bottom of each form.

5. Photographic equipment. A camera was used in connection with this research. Pictures are convincing to the student and parent, and may be necessary to impress those concerned, with the need for corrective work. Pictures may also be valuable evidence whenever it becomes necessary to defend the program, or when it is necessary to request additional equipment and assistance.

When using a camera, the room in which the examinations are conducted must have sufficient light so that a picture may be taken without the aid of artificial lighting. Flash exposures should not be attempted under any circumstances, because of the shadows, formed by the strings of the posture screen, on the subject. Reflected artificial light is satisfactory, but if used, will add to the expense involved. All photographs appearing in this research were made without the aid of artificial light.

It is also recommended that a camera be used, which will give a rectangular exposure of approximately the same proportions as that of the posture screen. Before a photograph of the spine is to be made, it is advisable to mark the spinal processes of the vertebrae with a posture pencil.

Environment and Facilities. Adequate facilities and equipment are important in conducting a corrective program. All distracting factors should be eliminated, because the

nature of the work requires the undivided attention of those being instructed. The conditions under which treatment is administered, can easily be a deciding factor in determining whether the corrective program will be successful.

1. Space. This is a major requirement. The most satisfactory results can always be obtained in the best environment. The size of the room should be determined by the size of the corrective classes, but under no condition should students be crowded. Those being treated for posture deviations should not be expected to take the corrective exercises in the presence of normal class-mates or spectators. Some students with posture deviations have already acquired a complex, and the presence of others would only complicate the situation.

2. Apparatus. Elaborate and expensive equipment is not necessary, or recommended, to carry out a good posture corrective program. The minimum requirements should be: (a) a full length mirror; (b) several stools; (c) one set of pulley weights; (d) adjustable rings; (e) stall bars; (f) several wands; (g) posters showing good and bad posture; (h) several mats; (i) a treatment table. More elaborate apparatus may be added as the program is expanded.

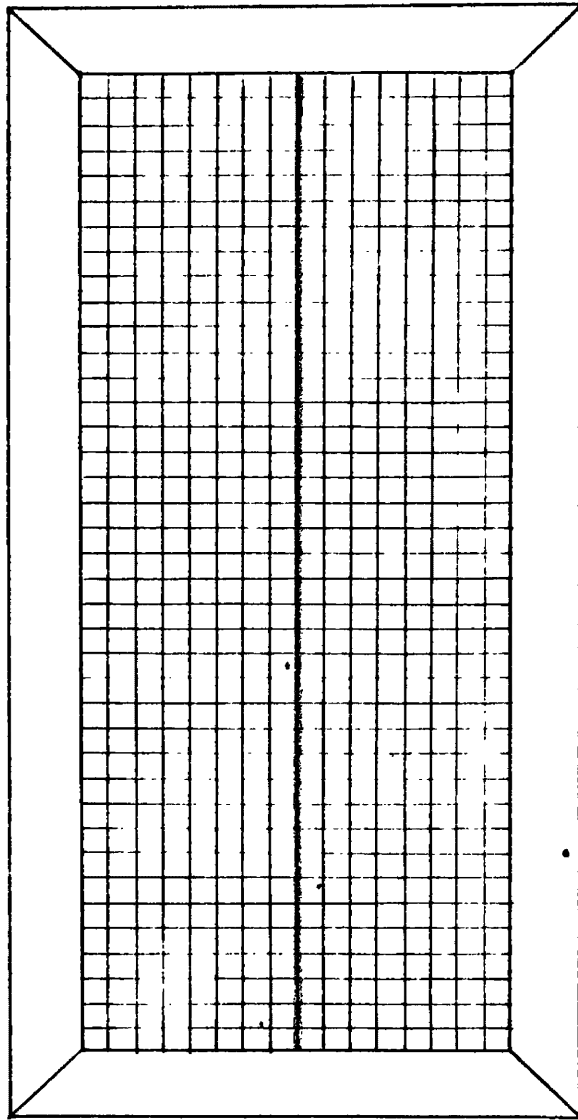
HOW TO USE SCREENING EQUIPMENT



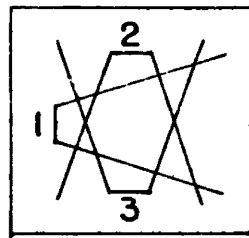
Plumb Line



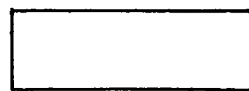
Posture Screen



POSTURE SCREEN



Top View



Side View

FOOT BOARD

Scale 3/4" = 1'

POSTURE WORK SHEET

Name _____ Date _____

Address _____ Phone _____

Class Schedule _____
 (hour) (day) (home room)

Medical record _____

POSTURE DIAGNOSIS	Date	Date	Date	Date
HEAD, forward				
right low				
SHOULDER, left low				
SHOULDER BLADES, separation				
CHEST, flat				
forward tilt				
PELVIS, backward tilt				
knock knee				
LEGS, bow leg				
pronated				
ANKLE inverted				
longitudinal				
FEET, flat transverse				
KYPHOSIS				
LORDOSIS				
SCOLIOSIS				
OTHER DEVIATIONS				

INSTRUCTIONS FOR USE OF CHART: Underline the deviation pertaining to the particular student you are examining. In the space provided under "date", check the deviation pertaining to the student being examined. One check indicates a slight deviation. Two checks indicates moderate condition. Three checks indicates severe condition. Four checks indicates serious condition.

CHAPTER IV

PROCEDURE

A factor of success in dealing with the individual, is winning the confidence and cooperation of the student. The posture program is difficult to conduct, because many of the students are subnormal physically and have developed a pronounced "complex" relative to their own postures. Complete medical histories should be obtained from the school nurse, or the family doctor. Parents can also offer valuable information concerning these histories, which should be thoroughly explored before any corrective work is begun. A certain student might have had a tubercular condition of the spine, and exercise is not recommended for such a case. Limited exercises only, are recommended for cardiac cases. Therefore, before dealing with students who do have complex medical histories, a doctor's approval of the treatment proposed, is essential.

The introductory work was an education program, seeking to; (1) teach the value of good posture; (2) teach what is meant by good posture, and; (3) attempt to make good posture traditional in the school.

One period of an hour's duration, was spent introducing the problem to all students. It was immediately

apparent that the students were extremely interested and inquisitive about posture in general. The lecture method was used almost entirely, with the exception of a few slides showing examples of good and bad posture, and the results of each. Valuable visual aids may be obtained from the State Film Library, concerning the value of good posture.

The student must be thoroughly taught what good posture is, for it is expecting too much to assume that he already knows. Considerable demonstration is recommended in dealing with this phase of the problem. Every member of the class was given an opportunity to see and feel the position of good posture.

An effort was made to make good posture traditional in the school, by giving general posture exercises at the beginning of each class period. The students were encouraged to assume positions of good posture and taught to observe and check one another's posture. This gave each student an opportunity to see how good and poor posture looked, as well as to "get the feel" of it. The students were also encouraged to check their sitting postures while in classes, as well as their walking postures, while going to and from classes and to and from school. Considerable competition was apparent between the Freshman and Sophomore

Classes, as to which could acquire the best posture.

It is generally assumed that the Cadets from West Point and Annapolis are fine examples of good posture. No doubt, good posture is traditional at both institutions. Considerable success was noted in making good posture traditional among the boys in the Freshman and Sophomore Classes at Missoula County High School. Stafford calls attention to the following situation, which existed in the Polytechnical Institute of Baltimore, Maryland:

In the issue of December 5, 1923, of the "Poly Press" a very good article on body mechanics started with the following statement, "Know a Poly Boy by His walk." It continued to state, "We want every boy to stand and walk correctly, so that any one can recognize him as a student of this school." The value of correct body mechanics to the student was carefully stressed, and nine points were listed to enable the student to determine what good body mechanics is. The article concluded with the statement that there is a golden mean in posture, which stands for self-respect and self-confidence, combined with courtesy and consideration for others.¹⁴

Following the educational introduction, the next step was to screen each student to determine whether any posture deviations existed. The students were extremely curious about their posture and, without exception, they immediately inquired as to how their posture could be

¹⁴ George T. Stafford, Preventive and Corrective Physical Education (New York: W. S. Barnes and Company, 1923), p. 119

corrected. All were informed that they would receive instruction relative to correcting the deviations, at a later date.

The screening for posture deviations is made difficult, because of the differences of opinion among examiners, when an attempt is made to establish objective standards for the appraisal of posture. Different examiners may not always agree as to what constitutes normal posture. These variable opinions may be influenced by age, race, hereditary background, body type, nutritional status, and the mental attitude of the student.

In this research, the examination of the students was made from three positions: lateral, anterior, and posterior. The student was asked to step upon the foot-board, take the number one position, as indicated on the foot-board, and assume a natural position without tension, eyes straight ahead. All deviations from normal were recorded, and photographs were made of some students with abnormal or unusual deviations.

Lateral View

From this position, it was possible to determine the body alignment, cervical, dorsal and lumbar curves, by observing whether the center string (gravity line) of the posture screen fell on approximately the following points:

(1) in front of the external malleolus of the ankle; (2) back of the patella, or knee cap; (3) middle of the great trochanter; (4) tip of the shoulder, and; (5) mastoid bone directly behind the ear.

Head and Neck Positions. In normal posture, the head is held erect, chin in, neck well back, and eyes straight ahead. Any deviation from the normal is conducive to nerve and muscular strain in the cervical region.

When the head is thrust forward, it is commonly due to improper segmental alignment below. The position of the head is important in connection with vision, as this change in eye level may effect the sight. At the same time, there is a greater strain on the erector spinae muscles of the neck, and the "turtle neck" condition may develop as a result.

It must be remembered that a forward head is usually compensatory to, or the cause of, other spinal curves existing, and the correction of one will aid in the correction of the others. When the forward head condition is present, there is a shortening of the sterno-cleido-mastoid and intercostal muscles, and a lengthening of the posterior neck muscles, namely; trapezius, scaleni and erector spinae.

Backward head is not a common deviation. This position of the head would effect proper vision and is

contradictory to what constitutes good head and neck alignment and normal posture. Incorrect mechanics on throwing back the shoulders, instead of lifting the chest by proper respiration, may be a factor in the development of the backward head.

Shoulder Alignment. Normally, the shoulders are held well back, and tip of the shoulder aligned with the gravity line. A common condition is where the tips of the shoulders are forward of the gravity line, causing round shoulders. This may be due to the under-development, or stretching of the trapezius, rhomboids, and serratus anterior, and the shortening of the pectoral muscles. The correction of this deviation would, therefore, require the shortening and conditioning of these muscles, and the stretching of the pectorals.

Chest. A normal chest is well-rounded and held fairly high. The thoracic cavity may vary considerably in shape and yet, be perfectly normal. Where the chest is extremely flat, the respiratory function is ordinarily limited and the breathing is more shallow. It is best to strive for a full thoracic cavity, as the heart and other internal organs are more freely suspended, and less crowding and sagging of the intestines takes place. Factors such as rickets, malnutrition, and fatigue are detrimental to normal

growth and may result in pigeon, funnel, or otherwise deformed chest.

Flat chest is usually associated with round shoulders and forward head. Shortening of the intercostal muscles and lengthening of the pectorals and the serratus posticus superior muscles, accompany the flat chest condition. The proper balancing of these antagonistic muscles would be necessary to correct the defect.

Spine. The ideal spine, from a lateral aspect, should have gentle curvature. A spine with accentuated lumbar, thoracic and cervical curves, or with negative curvature, is abnormal. Any marked changes, which are the result of faulty alignment, are worthy of attention. From the lateral view, kyphosis and lordosis will be considered.

Kyphosis is an exaggeration in the backward curve of the spine at the thoracic region. This condition should be differentiated from the round shoulder and the winged scapulae. Kyphosis is associated with the lengthening of the back extensor muscle groups in the thoracic region, and the shortening of the intercostal muscles. If not corrected in its early stages, kyphosis may gradually become more pronounced, since poor muscle tone of the anti-gravity back muscle groups will allow gravitational forces to increase the deviation.

Lordosis is an increase in the forward curve of the lumbar region of the spine. It may occur as a compensatory adjustment to improper weight distribution elsewhere, i.e., flat chest, kyphosis, and forward head. Compensatory lateral and anterior-posterior spinal curves are common. Lordosis is associated with the lengthening of the abdominal and hamstring muscles, and the shortening of the muscles in the lumbar region and the hip flexors.

Pelvis. Exaggerated pelvis inclination forward, is closely related to lordosis and a ptosis condition of the abdominal muscles. Since the sacro-iliac joint is immobile, any change in the position of the pelvis could be accompanied by a change in the curve of the spine. The forward tilt of the pelvis contributes to the sagging of the abdominal muscles, thus allowing the internal organs to fall out of their normal positions. The same muscles are involved in this deviation as in lordosis.

Anterior View

After the student was screened from a lateral view, he was asked to face the examiner, assume a natural position without tension, eyes straight ahead. Normal body alignment from the anterior aspect is determined when the gravity line falls through the following points: (1) mid-way between the heels; (2) on the umbilicus; (3) follows the linea alba,

or mid-line; (4) centers between the sterno-clavicular attachments, and; (5) bisects the head.

From this position, the following deviations from the normal may be observed:

Body Lean. By observing where the center line falls on the body, it is possible to detect any lean. Usually the head is carried to the opposite side of the lean in an effort to maintain balance and obtain proper vision. Curvature of the spine usually accompanies this condition. Body lean may be caused by disturbances at the base of the feet, or by one leg being shorter than the other.

Shoulder Level. Variation in the shoulder level may be muscular in nature. Some of the causes are due to injury, such as sterno-clavicular separation, lateral curvatures of the spine, carrying books under the same arm, riding with the arm resting on the window of an automobile, or occupational habits.

It should be remembered that any lateral curvature of the spine will, in most cases, cause a difference in shoulder levels, and the correction of this curvature will also correct the shoulder levels. When the spine is normal, then a low shoulder is due to a lack of tone, or development of the levator and the upper fibers of the trapezius muscle.

Foot Conditions. The posture screen aids in discover-

ing foot deviations. The vertical strings on the posture screen, which are spaced every two inches, can be utilized to recognize improper alignment of the foot with the rest of the body. The gravity line of the leg should pass from the anterior superior spine of the ilium, down through the middle of the ankle joint, and a point on the foot between the first and second toes. Since the feet serve as the foundation for the rest of the body, it is particularly important that any strain be eliminated and the body be aligned in its proper weight-bearing position.

When the bones of the feet and ankles are in their normal positions, they are arranged so as to form two arches, which afford certain mechanical advantages in the use of the feet. Whenever these bones depart from their customary position, the arches tend to flatten, or even disappear. If this occurs, the weight of the body falls heavily on the part of the foot directly under the leg bones, and is likely to cause pain and fatigue. When the arch of the foot is flat, the posterior tibial, flexor hallucis longus, and the flexor digitorum longus muscles have become lengthened, and the correction of this deviation would require the strengthening of these muscles.

Occasionally a weakness of the transverse arch, which sometimes leads to serious foot complications, is

observed. The resulting pain often incapacitates an individual to the extent that he is even unable to walk. Thick callouses are usually found on the sole of the foot, the metatarsal arch is flat on the floor, and the toes do not assume their normal position. This weakness is due to the stretching of the plantar ligaments and muscles.

Another painful foot condition is that of hammer-toes, in which the joints are above the ordinary toe level. This causes the toes to rub against the lining of the shoe, forming painful callouses and corns.

Posterior View

After the student was viewed from the anterior position, he was asked to assume the number three position on the foot-board with his head toward the examiner. From this position the body can be checked against the gravity line to observe deviations from normal.

The center line should fall on the following points: (1) mid-way between heels; (2) at the cleft of the buttocks; (3) center on the spinous processes of the back; (4) bisect the occipital region at the base of the skull and head.

From the posterior position, the following deviations from normal may be observed:

Head Tilt. In normal posture the head should be held erect and aligned with the other segments of the body.

The examiner should differentiate between a true head tilt and one that is the result of a lateral deviation of the spine.

A true head tilt occurs when posture is normal in every respect, but the head is tilted to either side of the gravity line. Such a condition may be caused by an auditory adjustment, faulty vision, peculiar study habits, where the head is rested on the desk, or hand, or by a weakness of certain neck muscles. These postural deviations can be corrected by removing the cause, and re-educating the muscles involved.

Head tilt accompanies most lordosis cases. Usually, if the lordosis condition is removed, this deviation will correct itself without the aid of corrective exercises.

Shoulder level. The shoulders should be level and symmetrical in their alignment with the rest of the body. The examiner should pay particular attention to any relationship between a low shoulder and scoliosis. A low shoulder often accompanies scoliosis, and when this spinal curve is corrected, the shoulder condition will also be corrected. The only occasion corrective exercises for the elevation of a shoulder are required, is when the spine is straight. In order to correct a low shoulder, the upper fibers of the trapezius must be strengthened.

Spinal Deviations. Scoliosis is a lateral curvature of the spine and can be most easily detected in the posterior view. Scoliosis may be of two types, namely, "C" curve and "S" curve. A uniform curvature, beginning at the pelvis and extending to the shoulders, is the "C" curve type scoliosis. The "S" curve type may curve to the right or left in the lumbar region, and vice-versa in the thoracic region. Scoliosis may be associated with shoulder and head tilt and a rotation of the pelvis.

In order to correct this deviation, it is necessary to strengthen the muscles on the outside, or convexity, of the curve and to stretch the muscles on the inside, or concavity, of the curve.

Leg and Knee Deviations. Improper knee alignments should be noted, because they may effect other segmental alignment of the body.

Knock-knee is often accompanied by pronated ankles and outward rotation of the entire leg, which causes the individual to "toe out" when walking. Knock-knee puts added strain on the inner border of the longitudinal arch, with a resulting stretching of the internal muscles and ligaments of the lower leg.

Bow-leg conditions should be recorded. Very little can be done in the way of correcting this deviation, and

unless severe, it can be ignored. Severe, or deformed cases should be referred to an orthopedist.

Ankle Deviations. These deviations are most easily detected by noting the alignment of the Achilles tendon, which should be nearly perpendicular in the normal ankle. If the tendon curves inward, pronation (eversion) is present, and if it curves outward, supination (inversion) is present.

Pronation places additional strain on the medial longitudinal, and transverse arch of the foot. There is a prominence of the internal malleolus, and, in severe cases, the scaphoid bone is allowed to drop to the same level as the heel and ball of the foot. Pronated ankles cause the student to walk with a gait, which has lost much of its spring and drive. When this condition is present, there is a weakening of the anterior and posterior tibial muscles, and a shortening of the peroneal muscles.

Supination, which causes much of the weight of the body to be supported on the outer border of the foot, is not as common as the everted foot, and does not effect normal foot movements as noticeably as does eversion.

Other Factors. When considering posture, attention should be given to contributing factors such as malnutrition, under-weight, fatigue, obesity, improper clothing, environment, mental attitude, poor vision and poor hearing. If

these factors are not removed, or minimized as early as possible, the temporary posture condition caused by their presence, may develop into a serious deviation.

CHAPTER V

DETERMINING A NEED

A major objective of this research was to determine, by conducting a survey of the Freshman and Sophomore boys enrolled in Missouri County High School, if a need for a correction program exists. Each boy in these two classes was screened according to the procedure outlined in Chapter IV.

An effort was made, first, to observe any deviation existing and, second, to classify the deviations in categories, according to their severity. In order that the screening be as accurate and consistent as possible, the standards of appraisement listed below were used.

Deviation

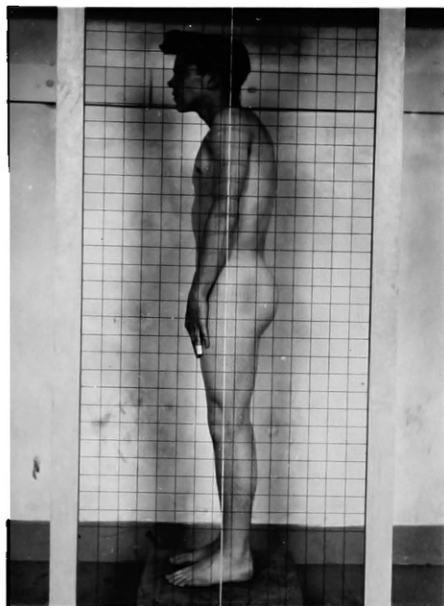
First degree. Any slight variation from the normal.

Second degree. Any variation from the normal greater than slight, but not great enough to severely handicap the student's normal activity and general appearance.

Third degree. Any variation from the normal greater than the second degree and severe enough that it may noticeably effect the student's normal activity and general appearance.

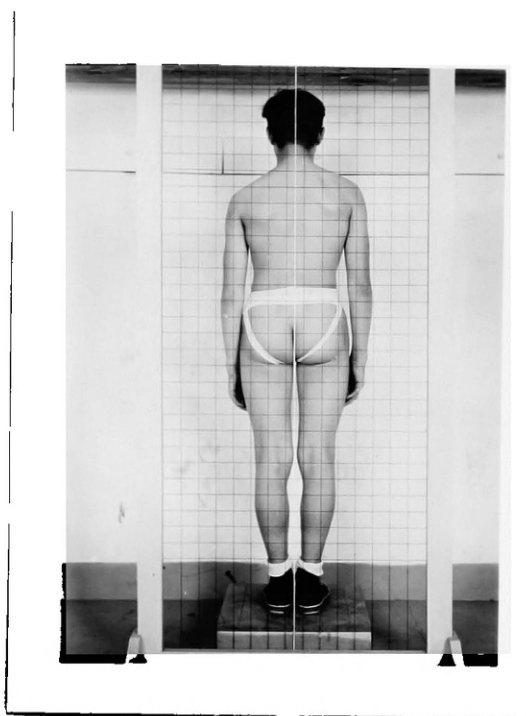
Fourth degree. Any pronounced variation from normal greater than the third degree. Usually structural in nature.

TORSO AND HEAD



	Freshmen	Sophomore
1st degree	26	46
2nd degree	40	29
3rd degree	13	3
4th degree	1	0
Total deviations	80	78
Number examined	123	107
Per cent with deviations	71.5	73.1

STANDARD HEIGHT (RIGHT)



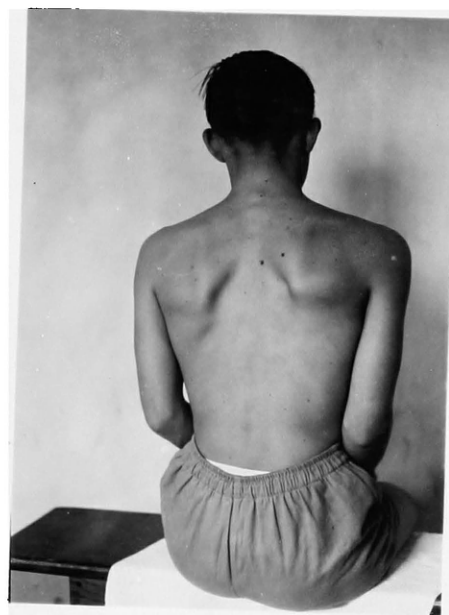
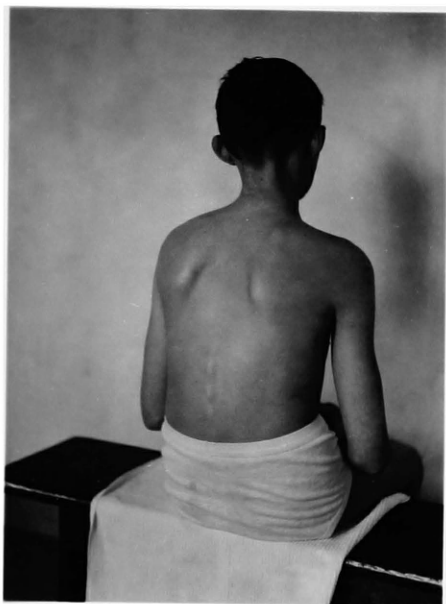
	Freshman	Sophomore
1st degree	2	2
2nd degree	5	2
3rd degree	4	0
4th degree	1	0
Total deviations	12	4
Number examined	123	107
Per cent with deviations	9.8	3.7

CLAVICLE HIGH (LEFT)



	Freshmen	Sophomore
1st degree	8	6
2nd degree	20	11
3rd degree	10	3
4th degree	10	0
Total deviations	38	20
Number examined	123	107
Per cent with deviations	30.7	18.6

SHOULDER BLADDER DEVIATION



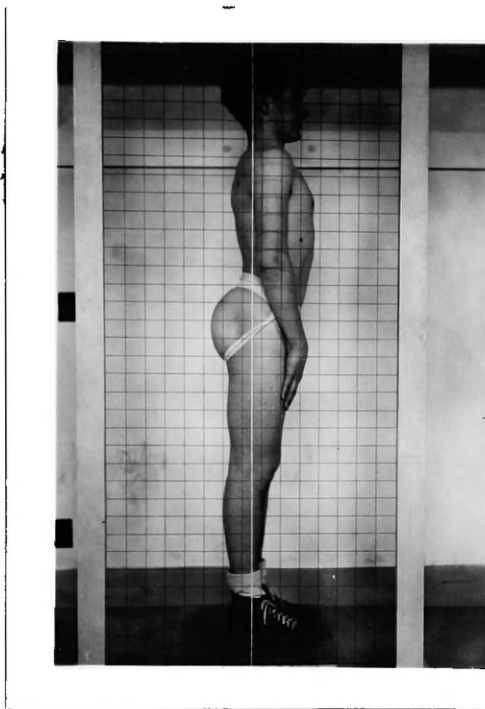
	Freshmen	Sophomore
1st degree	14	5
2nd degree	2	6
3rd degree	3	0
4th degree	0	0
Total deviations	19	11
Number examined	123	107
Per cent with deviations	15.5	10.3

CHEST (FLAT)



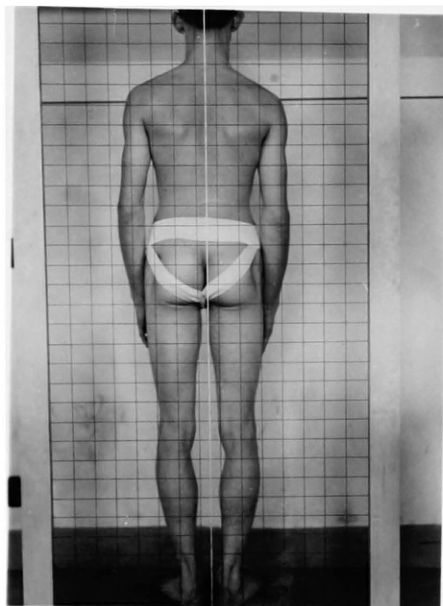
	Freshmen	Sophomore
1st degree	8	15
2nd degree	15	7
3rd degree	5	0
4th degree	0	0
Total deviations	28	22
Number examined	123	107
Per cent with deviations	22.7	20.5

PELVIC TILT



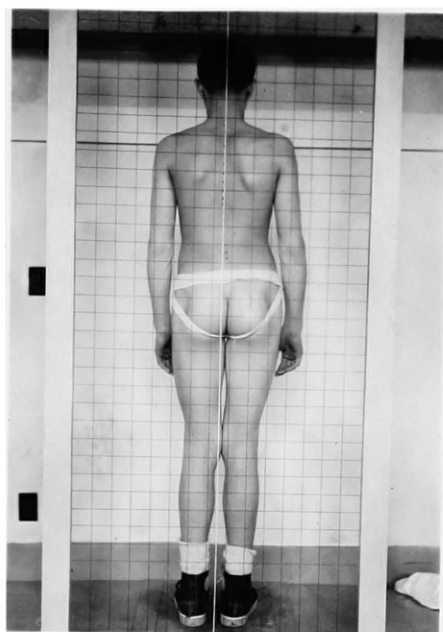
	Freshman	Sophomore
1st degree	18	21
2nd degree	35	16
3rd degree	10	0
4th degree	1	0
Total deviations	54	37
Number examined	123	107
Per cent with deviations	43.9	34.5

BOJ LEG



	Freshman	Sophomors
1st degree	2	3
2nd degree	7	6
3rd degree	3	1
4th degree	0	0
Total deviations	12	10
Number examined	133	107
Per cent with deviations	9.0	11.2

KNOCK KNEE



	Freshman	Sophomore
1st degree	0	2
2nd degree	2	4
3rd degree	3	4
4th degree	0	0
Total deviations	5	10
Number examined	123	107
Per cent with deviations	04.1	09.3

FRONTAL ANGLE



	Freshmen	Sophomores
1st degree	18	10
2nd degree	14	7
3rd degree	3	4
4th degree	1	3
Total deviations	36	24
Number examined	123	107
Per cent with deviations	19.5	32.7

INVERTED ANKLES



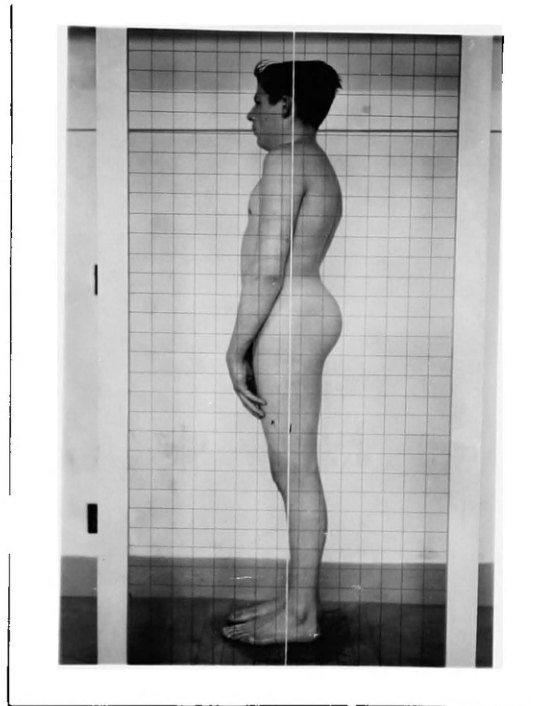
	Freshman	Sophomore
1st degree	6	6
2nd degree	1	3
3rd degree	1	1
4th degree	0	0
Total deviations	8	10
Number examined	123	107
Per cent with deviations	06.5	09.34

FLAT FOOT



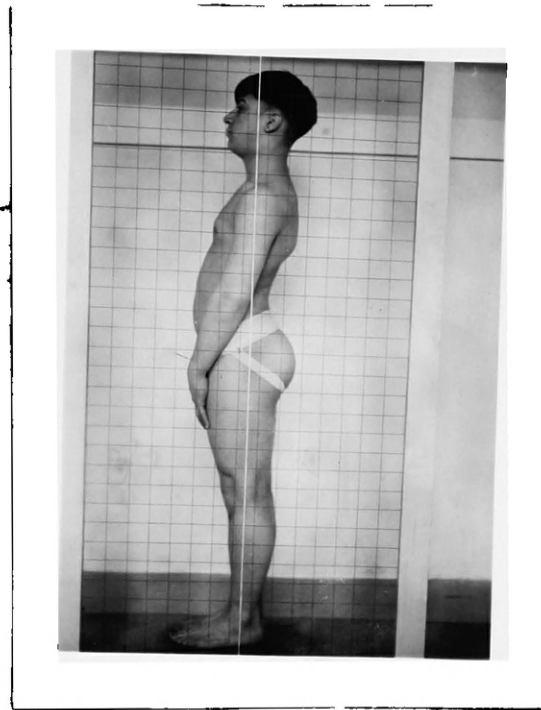
	Freshman	sophomores
1st degree	21	14
2nd degree	9	11
3rd degree	10	3
4th degree	1	0
Total deviations	41	28
Number examined	123	107
Per cent with deviations	33.3	26.1

BACK (KYPHOSIS)



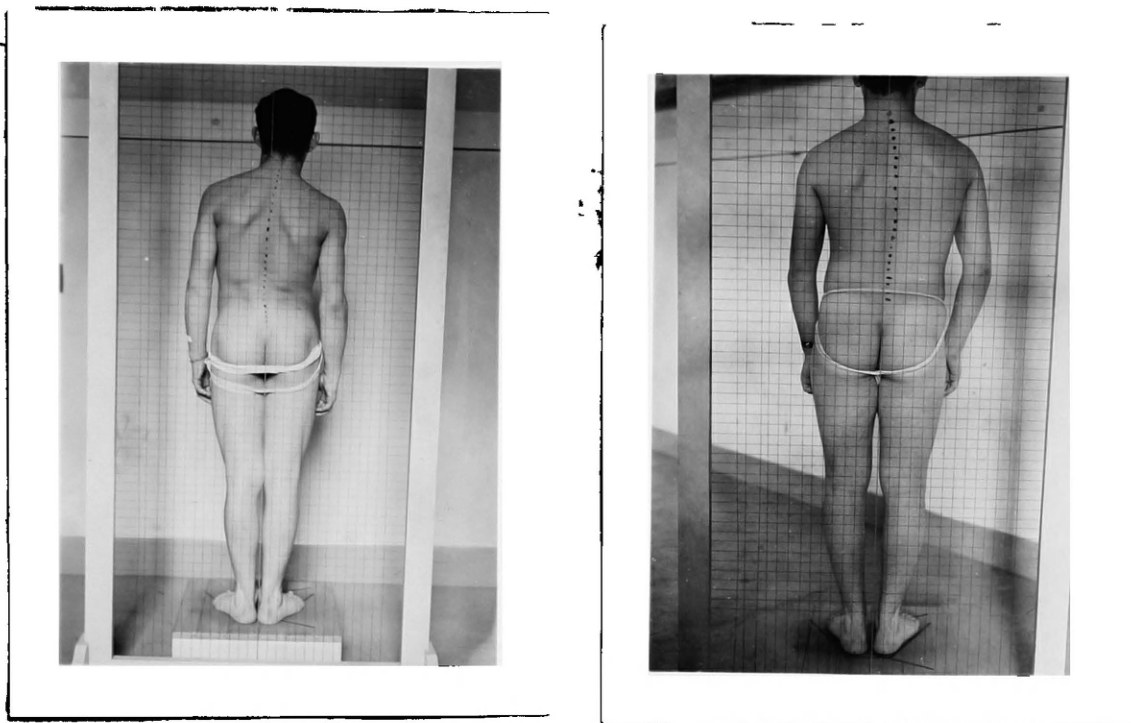
	Freshman	Sophomora
1st degree	25	31
2nd degree	21	16
3rd degree	5	3
4th degree	0	0
Total deviations	51	50
Number examined	123	107
Per cent with deviations	41.4	46.7

BACK (LORDOSIS)



	Freshmen	Sophomore
<u>1st degree</u>	<u>27</u>	<u>31</u>
<u>2nd degree</u>	<u>25</u>	<u>17</u>
<u>3rd degree</u>	<u>8</u>	<u>1</u>
<u>4th degree</u>	<u>1</u>	<u>0</u>
<u>Total deviations</u>	<u>61</u>	<u>49</u>
<u>Number examined</u>	<u>123</u>	<u>107</u>
<u>Per cent with deviations</u>	<u>49.6</u>	<u>45.7</u>

BACK (SCOLIOSIS)

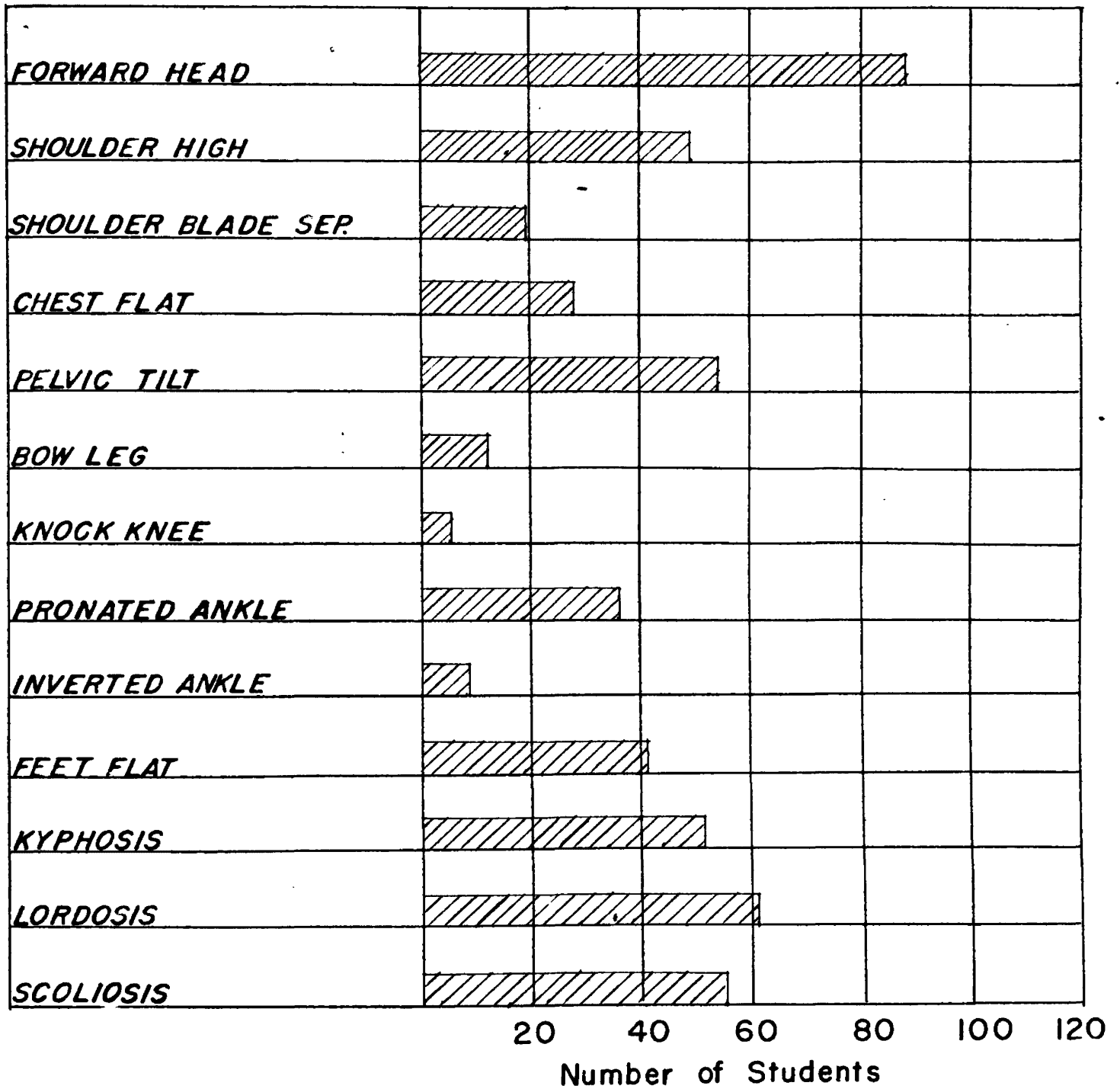


	Freshmen	Sophomores
1st degree	30	25
2nd degree	21	11
3rd degree	5	1
4th degree	1	0
Total deviations	55	33
Number examined	123	107
Per cent with deviations	44.7	34.8

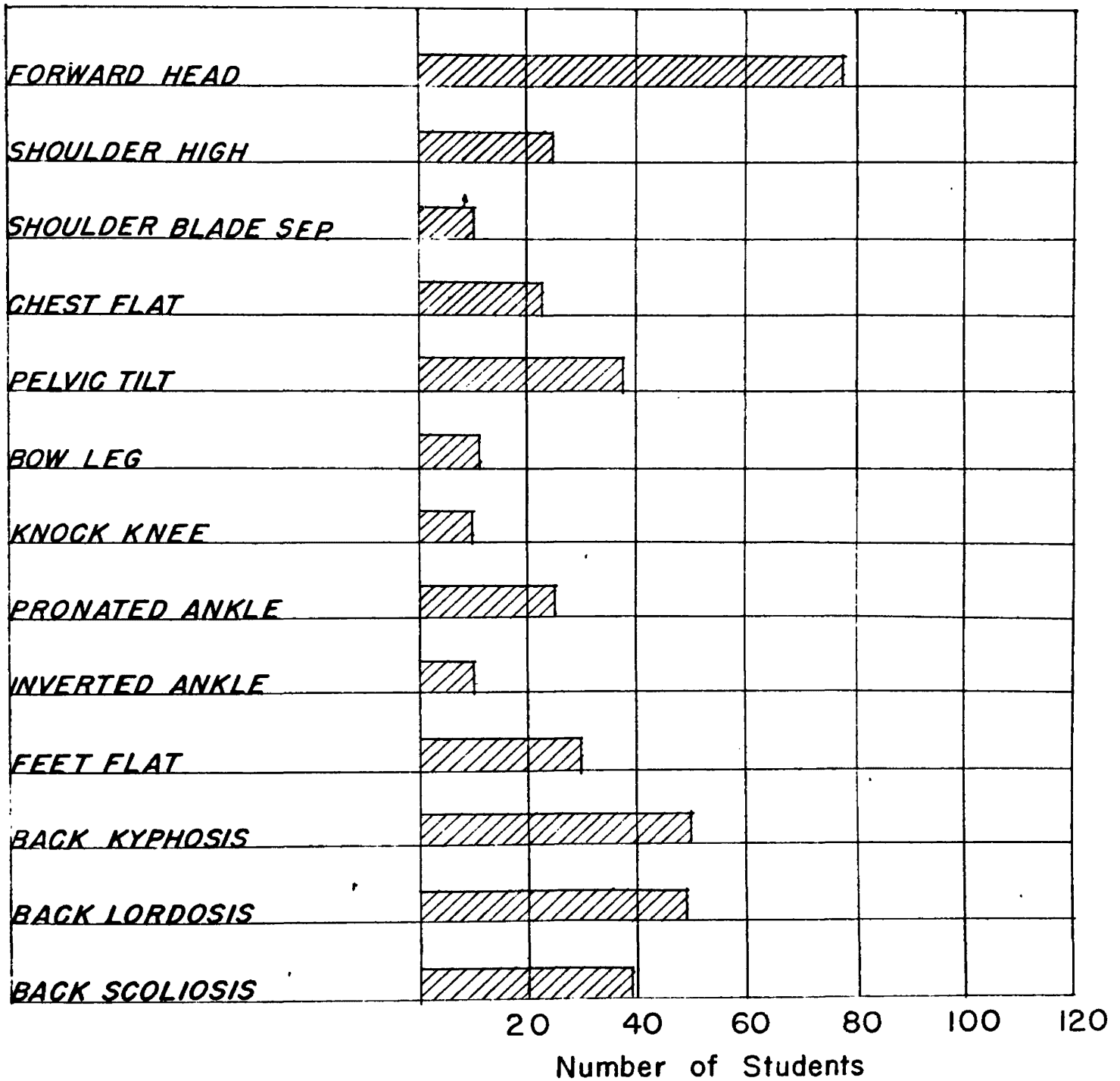
COMPOSITE LIST OF DEVIATIONS

Deviation	Freshman	Sophomore
Forward head	23	78
Shoulder high	50	24
Shoulder blade separation	19	11
Chest (flat)	28	22
Pelvic tilt	54	37
Bow legs	12	12
Knock knees	5	10
Pronated ankles	36	24
Inverted ankles	8	10
Feet (flat)	41	28
Back (kyphosis)	51	50
Back (lordosis)	61	42
Back (scoliosis)	55	38
Total deviations	509	393
Number examined	123	107
Average deviation per student	4.1	3.67
Number with perfect posture	6	6
Per cent with perfect posture	4.9	5.6

NUMBER OF POSTURE DEVIATIONS IN FRESHMAN CLASS



NUMBER OF POSTURE DEVIATIONS IN SOPHOMORE CLASS



SUMMARY

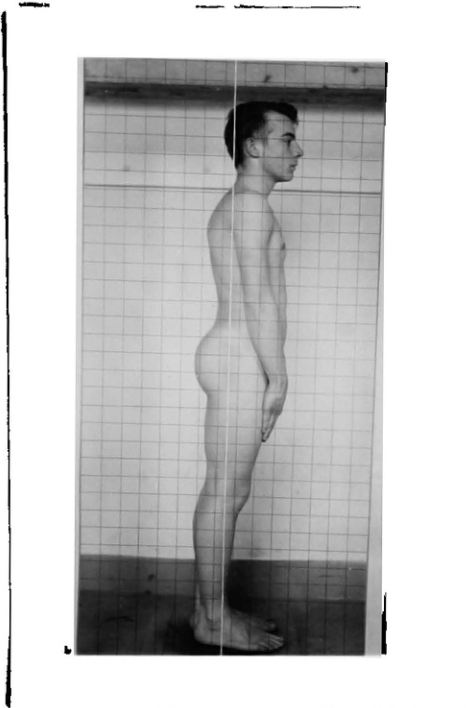
A summary of the results of the screening for posture deviations, reveal some notable facts.

1. Out of 230 students examined, only twelve (05.25 per cent) had perfect posture.

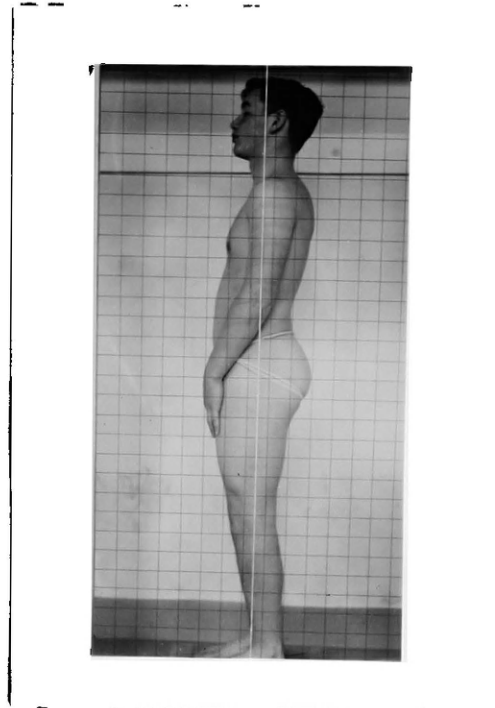
2. A total of 911 deviations were detected in the two classes, or an average of 03.96 deviations per student. It is interesting to note that there are more deviations per student in the Freshman Class (04.01) than in the Sophomore Class (03.07).

The foregoing figures indicate that there is a need, among the Freshmen and Sophomore boys of Missoula County High School, for a posture correction program.

SUPPLEMENTARY DEVIATIONS



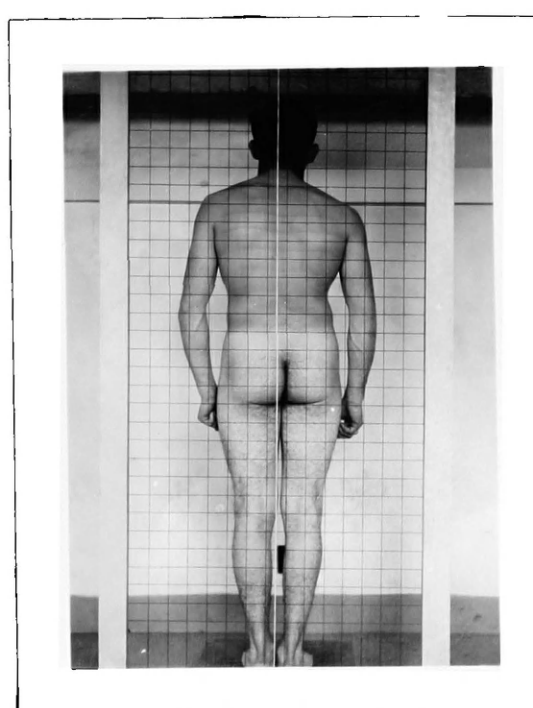
Forward Lean



Backward Lean

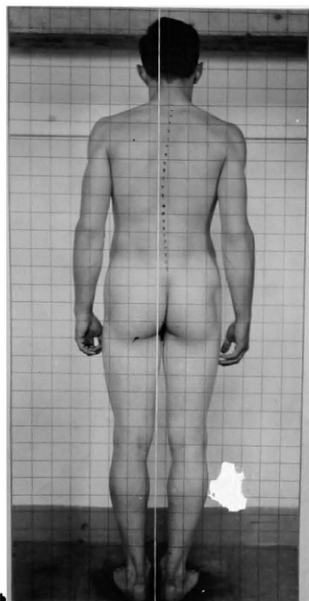


Lateral Lean

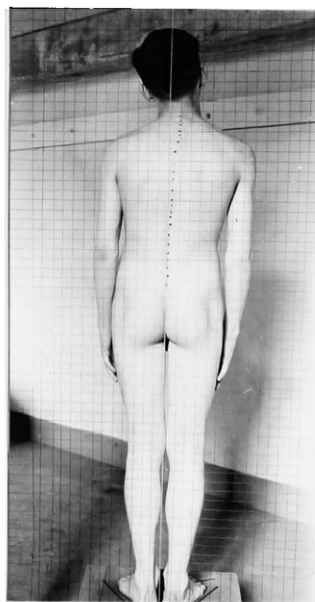


Pelvic Twist

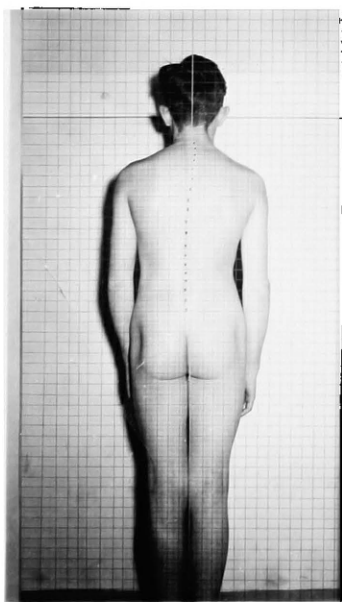
SUPPLEMENTARY DEFINITIONS



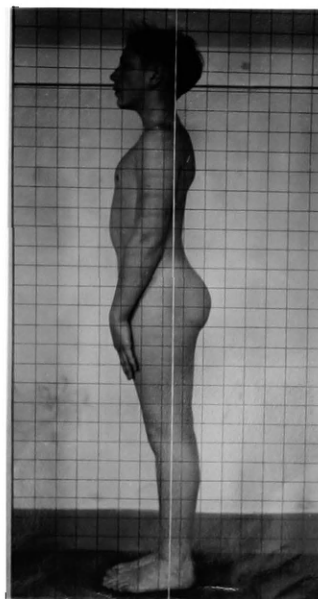
Scoliosis



Scoliosis



Scoliosis



Lordosis

CHAPTER VI

TREATMENT RELATIVE TO NORMAL POSTURE

The treatment of faulty body mechanics has been too largely concerned with the attempt to relieve the local condition. Successful relief or improvement of faulty body mechanics must embrace a much larger scope than the local condition. It must consider the entire body and the various environmental factors which influence body mechanics. The habits of the individual, his environment, his occupation, his use of leisure time, his mental set and his general health and body tone influence body mechanics. These factors must be considered in the treatment of faulty body mechanics.¹⁵

Both Stafford¹⁶ and Drew¹⁷ believe that before corrective exercises are administered, the cause of poor posture should be removed. Good health habits, proper teaching of the elements which constitute good posture, and the creation of the desire to have good posture, are essential before any exercises are administered.

To get the best results from posture work it should be made educational. Young people should be taught the structure of the body, the reason for its form, the function of the organs and the positions in which they can best do their work, the workings of the muscles and

¹⁵ George T. Stafford, Preventive and Corrective Physical Education (New York: W. C. Garrace and Company, 1928), p. 115

¹⁶ Loc. cit.

¹⁷ Lillian Curtis Drew, Individual Gymnastics (Philadelphia: Lea & Febiger, 1925), p. 31

how to control them. They should be taught the effect upon the body of incorrect posture, the interference with the functioning of the organs if these are allowed to get out of place, the unnecessary fatigue caused by overused muscles and imperfect circulation, the consequences of compressed and narrowed chest walls, and that crooked spines in their old age will be the result of unnecessary postural curves. Many will be hard to convince, for the young frequently live for the day and give no thought to the future, but a large per cent of those instructed will understand the value of correct posture and make an effort to acquire it.¹⁸

Exercise should not be claimed as a panacea for all postural defects and the over-emphasis of this factor may bring justified criticism when a department attempts corrective work beyond its depth. In some instances, a great amount of good may be derived from the teaching of proper methods of rest and relaxation. Mainly, instruction should be pointed toward giving exercises which will strengthen some muscle groups and stretch others, thereby, providing balance as a result of segmental alignment and proper muscle tone.

The exercises used in this research, which will be listed in this chapter, are divided into two categories. First, those administered to the entire class to improve the general posture, and second, those administered to the students with posture deviations which will require specific corrective exercises.

General Posture Exercises

These exercises are designed to improve the posture

of every student in the class and assist in making good posture habitual. They were administered at the beginning of each class period as a part of the limbering-up exercises, preparatory to the scheduled activity. Students were encouraged to be constantly aware of the following facts regarding good posture: (1) head is balanced above the shoulders, hips, and ankles; (2) chest is elevated; (3) lower abdomen is retracted; (4) gluteal muscles are tightened; (5) knees are slightly flexed; (6) feet are parallel and slightly apart; (7) weight is distributed through the center of the ankle joint and held slightly on the outer border of the foot.

Back Lying

1. Rest breathing--elbows flexed and arms in outward rotation, raise chest and hold chest high while breathing deeply.

2. Abdominal breathing--inhale by relaxing abdominal muscles, exhale by contracting abdominal muscles.

3. Abdominal retraction--lying, hands at sides, knees flexed and feet resting on the floor.

(a) Contract abdominal muscles

(b) Contract buttocks muscles

(c) Combine (a) and (b)

4. Alternate leg raising and lowering, maintaining abdominal retraction.

- (a) with legs extended on mat, raise and lower alternate leg.
- (b) with knees flexed to ninety degrees, feet flat on floor, alternate knee extension and leg lowering and return to starting position.
- (c) with knees flexed on chest, extend knee and lower to mat. Return to starting position.

5. Arm exercises--maintaining abdominal retraction.

- (a) windmill--hands at side, elbow straight, extend one arm above head, then alternate.

6. Trunk exercise--lying, arms folded on chest, legs extended and held down, raise to a sitting position and return.

7. Body stretching exercise--(May be given face lying). Reach with extended heels and arms.

Face Lying

- 1. Clasp hands behind back and retract shoulders.
- 2. "Chicken wing." Arms at horizontal abduction with elbows flexed, retract shoulders.
- 3. Arms extended sideways, with shoulders retracted, circumduct the arms.

4. Airplane exercise.

- (a) Touch fingers behind neck keeping elbows on the same plane with the shoulders.
- (b) Raise elbows
- (c) Turn head and raise shoulders, keeping chin in.
- (d) Relax
- (e) Repeat, bending trunk first to the right and then to the left.

CAUTION: It may be necessary to have the feet held down, to get the maximum results from this exercise.

Standing

- 1. Use face lying and back lying exercises in standing position.
- 2. Stand tall.
- 3. Wall posture exercises.
 - (a) Obtain proper trunk posture with back resting against the wall, knees and hips flexed to right angles, feet apart. (Sitting position). Gradually slide upward, bringing feet toward the wall. Continue sliding upward until lumbar spine can no longer be held against the wall.
 - (b) Pull away from the wall with motion only at ankle joints. (1) Walk around the room and return to the wall. Students should check each other, as to whether

their posture is as good when they return to the wall, as when they left it, and what changes occurred when they walked. (2) Repeat, skip around the room, return to starting position and check posture.

Specific Posture Exercises

Following the screening for posture deviations, arrangements were made with the students for individual guidance and corrective work. At this time, a further recheck is advisable to substantiate the findings of the first screening test. Now, the services of a physician should be obtained to recommend and approve the proper follow-up treatment.

When explaining to the students, the need for posture exercises, it cannot be stressed too much that any improvement is mainly their own responsibility. Each student should be told the nature of his deviation and why the prescribed exercises are being recommended. Individual guidance, observation, and assistance is recommended, although small classes may be organized on a basis of the corrective needs.

It was found that the best results were obtained when the students were asked to report for special instruction, either after school, or during a study hall period. As a rule, students should not be expected to give up a regular activity class to take specific posture exercises. There

may be certain instances when it is advisable, because of the nature of the deviation, to restrict the students' physical education to corrective exercises, only.

The best results were noted when the first five minutes of the period were used as a warm-up, or limbering-up exercise period. Such exercises aid in loosening up the muscles, stimulate circulation, and serve as a preventive against muscle injury. A gradual increase in the tempo of these warm-up exercises is important, and the choice should include movements which will stimulate as many parts of the body as possible. They should include stretching exercises, which aid in increasing the range of movement, thus tending toward a balance of the pull of antagonistic muscle groups.

Since coordination of the body movements is vital to good posture, rhythmic exercises have much to contribute and can be used to good advantage. Corrective exercises often become tiresome. Stunts, games and relays, which also have therapeutic value, contribute in creating a diversified program. Whenever possible, activities of this nature should be used as a means of stimulating interest, for they have considerable appeal and are at the same time beneficial.

It is not proposed to present a complete list of exercises for all types of deviations which may be dis-

covered. In many of the deviations previously described, the general posture exercises will improve the condition by increasing general fitness and muscle tone. Sometimes, exercises which assist in the correction of one condition, will contribute to the improvement of others.

The following exercises, used in the treatment of specific deviations, appear on the succeeding pages:

MARBLE GRIP

Specific for: Knock knees.

Beneficial in: Pronated ankles, weak longitudinal and metatarsal arches.

Starting position: Sitting on bench with heels on mat.

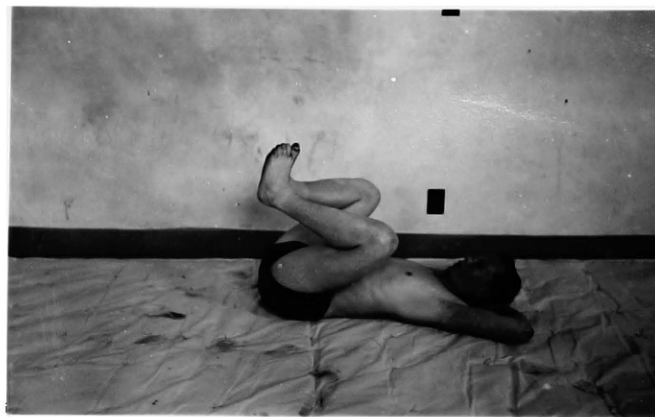
Place marbles in front of each foot.

1. Gripping marbles in toes of left foot, bring ankle to rest on right knee --RAISE.
2. Forcing left knee downward with left hand, raise toes of left foot, pointing heel toward floor -- LOWER.
3. Resting foot and releasing marbles -- RELAX.

Repeat exercise alternately with right and left foot.

CAUTION: Maintain good sitting posture while executing this exercise.

HOOK LYING



Specific for: Lordosis.

Beneficial in: Kyphosis, backward head, pronated ankles.

Starting position: Backward lying.

1. Bending knees in hook lying position, soles of feet together -- PLACE.
2. Neck -- REST.
3. Head forward bending, knees to chest position with soles of feet together -- RAISE.
4. Head upward, knees stretching, heels to mat -- SINK.

By the numbers, repeat exercise.

CAUTION: Maintain chin down and hands and shoulders on mat when raising head. Keep back flat throughout.

CHEST WEIGHTS



Specific for: Shoulder girdle, forward head.

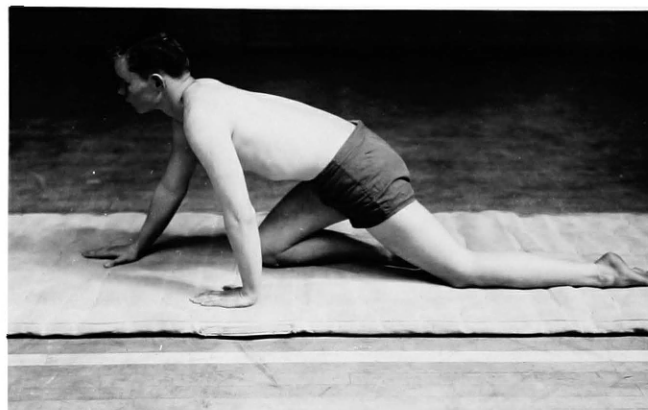
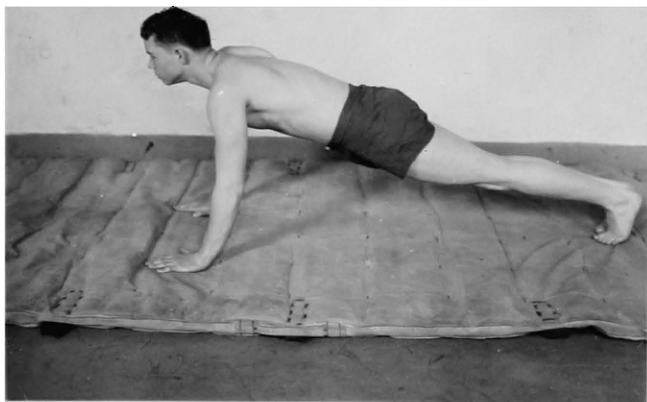
Beneficial in: Kyphosis, round shoulders, chest conditions.

Starting position: Beach stride standing, grasping handles.

1. Trunk forward bending, arms downward -- SWING.
2. Inhaling, trunk upward stretching, arms sideways -- SWING.
3. Exhaling, trunk forward bending, arms forward and reaching to toes -- SWING.

By the numbers, repeat exercise.

Caution: Maintain neck and shoulders erect, chest high, abdomen tense, and gluteals contracted.

PANTHER CREEPING

Specific for: Lordosis.

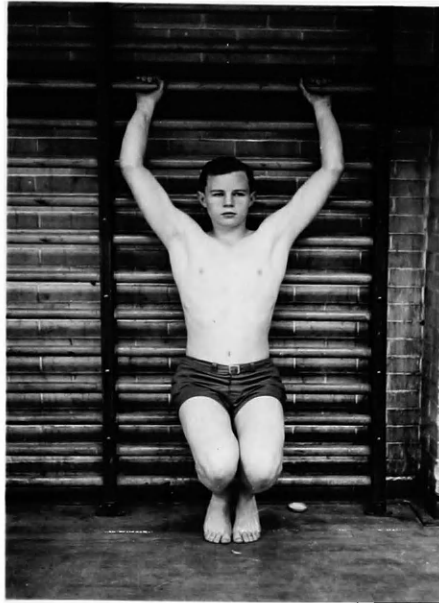
Beneficial in: Rotated pelvis.

Starting position: Stoop falling.

1. Stride kneeling, keeping hands on mat -- PLACE.
2. Tension abdomen, keeping neck and back level, creeping with long strides of knees and arms combined with alternate hand and knee -- BEGIN.
3. Continue creeping until command -- HALT.

CAUTION: This exercise is contradicted in bad knee conditions.

STALL BAR PRESS



Specific for: Lordosis.

Beneficial in: Neck alignment, shoulder and chest conditions.

Starting position: Back to stall bars, feet ten inches from wall, arms bent, arms grasping stall bars shoulder height.

1. Flatten neck and back against stall bars -- PRESS.
2. Tighten abdomen and bend knees, with spinal column flat, to full arm extension --BEND.
3. Flex arms, knees -- STRETCH.

CAUTION: Hold abdomen firm, back and neck flat against stall bars at all times.

WAND STRETCH



Specific for: Kyphosis.

Beneficial in: Round shoulders, forward head.

Starting position: Stretch standing, with wand.

1. Bend arms, bring wand behind head and shoulders while exhaling -- LOWER
2. Trunk forward -- BEND
3. Lift wand over head, keeping head aligned with the back -- RAISE
4. Inhale while raising arms upward -- STRETCH

By the number, repeat exercise.

CAUTION: Keep elbows well back and close to sides, with the body aligned.

BREAKING CHAINS



Specific for: Round shoulders

Beneficial in: Kyphosis, flat chest, forward head

Starting position: Forward bend standing

1. Backward movement of elbows in transverse plane --
STRETCH.
2. INHALE
3. HOLD
4. Arms downward -- STRETCH

By the number, repeat exercise

CAUTION: Tense abdomen, and maintain head in the starting position during entire exercise. Where lordosis is present, execute exercise from sitting position, tailor fashion.

FOOT CURLING



Specific for: Longitudinal arch.

Beneficial in: Pronated ankles.

Starting position: Sitting on bench. Fold towel lengthwise with weight of about four pounds on one end. Bring toes of right foot to rear and outside of extended heel to serve as a brace.

1. Raise toes of left foot and rotate on heel, laterally -- PLACE.
2. Press foot down one towel and rotate the foot inward -- TWIST.

Repeat movements until weight is reached.

CAUTION: Knee and heel must remain in a stable vertical position. Do not curl toes, but keep flat on towel, pulling with ball of the foot.

BODY STRETCHER

Specific for: Forward head.

Beneficial in: Round shoulders and kyphosis.

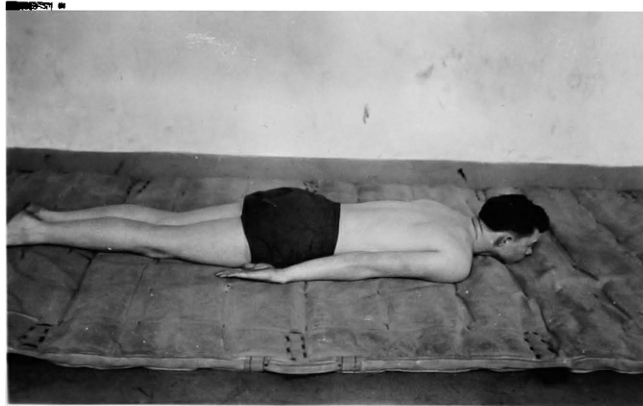
Starting position: Rest standing.

1. Trunk forward -- BEND.
2. Arms sideways, palms upward -- STRETCH.
3. Trunk upward -- STRETCH.
4. Arms upward and inhale -- STRETCH.
5. Arms downward -- STRETCH.

By the numbers, repeat exercise.

CAUTION: Maintain firm pressure against neck, chin in, not upward.

CLEAN DIVE



Specific for: Forward head.

Beneficial in: Round shoulders and kyphosis.

Starting position: Face lying.

1. Arms sideways and upward, palms upward -- SWING.
2. Raising arms, chin and shoulders clear of the mat, separating hands ninety degrees -- LIFT.
3. INHALE.
4. Arms sideways and downward -- SWING.

By the numbers, repeat exercise.

Caution: Chest must not be raised clear of the mat, as this exercise would otherwise accentuate lordosis.

FOOT CIRCLING



Specific for. Metatarsal arch

Beneficial in: Longitudinal arch

Starting position: Sitting on bench--full extension of knees and feet.

1. with toes flexed, circling foot -- IN
2. with toes flexed, circling foot -- U.
3. with toes flexed, circling foot -- OUT
4. with toes flexed, circling foot -- DOWN

Repeat movements several times, then rest.

CAUTION: Value lies in obtaining full plantar flexion, inversion, dorsal flexion, eversion, and maintaining toe grip.

SHOULDER SHRUGGING

Specific for: Low shoulder

Beneficial in: Head tilt, forward shoulder

Starting position: Attention

1. Low shoulder vertically to maximum height -- RAISE
2. Shoulder downward -- STRETCH

By the number repeat exercise

CAUTION: When shrugging, maintain erect position with both shoulders well back and scapulae flat.

FORWARD BEND

	Freshmen	Sophomores
1st degree	44	26
2nd degree	7	2
3rd degree	1	0
4th degree	0	0
Total deviations	52	28
Number examined	103	89
Per cent with deviations before posture instruction	71.5	72.9
Per cent with deviations after posture instruction	50.4	31.2

SHOULDER HIGH

	Freshmen	Sophomores
1st degree	14	4
2nd degree	5	2
3rd degree	1	3
4th degree	0	0
Total deviations	20	9
Number examined	103	89
Per cent with deviations before posture instruction	45.3	22.4
Per cent with deviations after posture instruction	19.4	10.1

SHOULDER BLADE SEPARATION

	Freshman	Sophomore
1st degree	11	1
2nd degree	2	1
3rd degree	0	0
4th degree	0	0
Total deviations	13	2
Number examined	103	89
Per cent with deviations before posture instruction	15.5	10.3
Per cent with deviations after posture instruction	12.6	02.2

CHEST (FLAT)

	Freshman	Sophomore
1st degree	12	8
2nd degree	3	1
3rd degree	0	0
4th degree	0	0
Total deviations	15	9
Number examined	103	89
Per cent with deviations before posture instruction	22.7	20.5
Per cent with deviations after posture instruction	14.5	10.1

PILVIC TILT

	Freshman	Sophomore
1st degree	12	17
2nd degree	4	2
3rd degree	0	0
4th degree	0	0
Total deviations	16	19
Number examined	103	99
Per cent with deviations before posture instruction	43.9	34.5
Per cent with deviations after posture instruction	15.5	21.3

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	Freshman	Sophomore
1st degree	7	4
2nd degree	2	3
3rd degree	2	1
4th degree	0	0
Total deviations	11	8
Number examined	103	99
Per cent with deviations before instruction	9.8	11.2
Per cent with deviations after instruction	10.8	9.9

KNOCK BALL

	Freshman	Sophomors
1st degree	1	6
2nd degree	2	2
3rd degree	0	0
4th degree	0	0
Total deviations	3	8
Number examined	103	89
Per cent with deviations before posture instruction	04.1	09.3
Per cent with deviations after posture instruction	02.9	08.9

FRONTED AXLE

	Freshman	Sophomors
1st degree	9	8
2nd degree	6	5
3rd degree	2	3
4th degree	0	0
Total deviations	17	16
Number examined	103	89
Per cent with deviations before posture instruction	22.2	22.4
Per cent with deviations after posture instruction	16.5	17.9

INVERTED ANKLE

	Freshman	Sophomore
1st degree	3	3
2nd degree	2	3
3rd degree	0	0
4th degree	0	0
Total deviations	5	6
Number examined	103	69
Per cent with deviations before posture instruction	06.5	09.3
Per cent with deviations after posture instruction	04.8	06.7

FEET (FLAT)

	Freshman	Sophomore
1st degree	17	10
2nd degree	8	8
3rd degree	4	1
4th degree	0	0
Total deviations	29	19
Number examined	103	69
Per cent with deviations before posture instruction	33.3	26.1
Per cent with deviations after posture instruction	28.1	21.3

BACK (KYRHOEIS)

	Freshmen	Sophomores
1st degree	18	24
2nd degree	3	4
3rd degree	1	1
4th degree	0	0
Total deviations	22	29
Number examined	103	89
Per cent with deviations before posture instruction	41.4	46.7
Per cent with deviations after posture instruction	21.3	32.6

BACK (LORDOSIS)

	Freshmen	Sophomores
1st degree	13	22
2nd degree	8	2
3rd degree	1	0
4th degree	0	0
Total deviations	22	24
Number examined	103	89
Per cent with deviations before posture instruction	49.6	45.7
Per cent with deviations after posture instruction	21.3	27.1

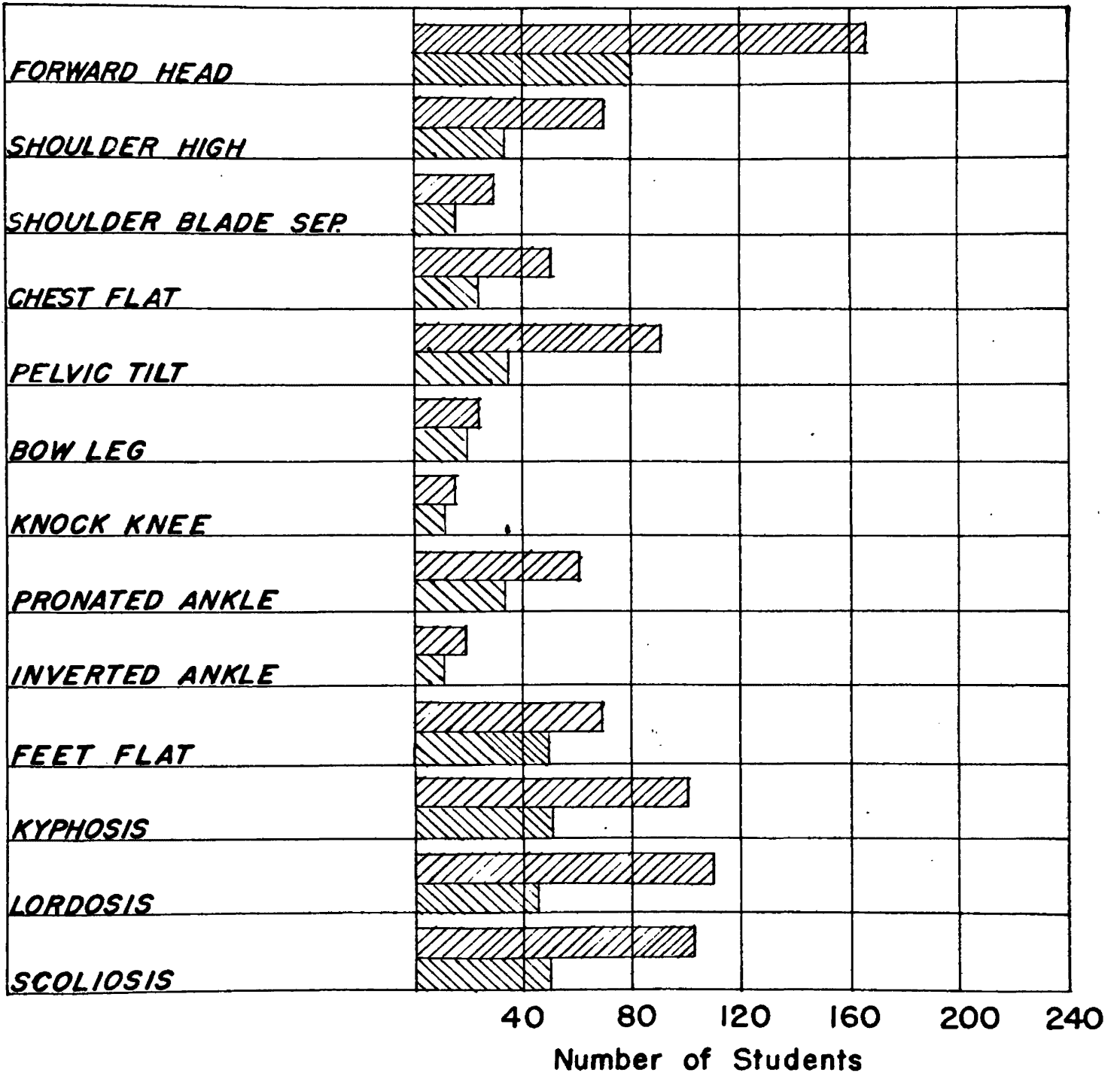
BACK (SCOLIOSIS)

	Freshman	Sophomore
1st degree	21	11
2nd degree	10	7
3rd degree	1	1
4th degree	0	0
Total deviations	32	19
Number examined	103	89
Per cent with deviations before posture instruction	44.7	34.8
Per cent with deviations after posture instruction	31.1	21.3


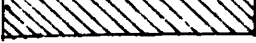
COMPOSITE LIST OF DEVIATIONS BEFORE AND AFTER TREATMENT

Deviation	Freshman		Sophomore	
	Before	After	Before	After
Forward head	88	52	78	28
Shoulder high	50	20	24	9
Shoulder blade separation	19	13	11	2
Chest (flat)	28	15	22	9
Pelvic tilt	54	16	37	19
Bow legs	12	11	12	8
Knock knees	5	3	10	8
Pronated ankles	36	17	24	16
Inverted ankles	8	5	10	6
Feet (flat)	41	29	28	19
Back (kyphosis)	51	22	50	29
Back (lordosis)	61	22	49	24
Back (scoliosis)	55	32	38	19
Total deviations	508	257	393	196
Number examined	123	103	107	89
Average deviation per student	4.10	2.49	3.67	2.20
Number with perfect posture	6	13	6	10
Per cent with perfect posture	4.90	12.6	5.6	11.2

TOTAL DEVIATIONS BEFORE AND AFTER TREATMENT



LEGEND

Before 
 After 

Summary

A summary of the results of the posture correction program conducted at Missoula County High School over a three month period, shows that the methods employed in treating posture deviations have been successful.

1. The number of students with perfect posture after instruction was twenty three (11.73 per cent). Before instruction, twelve students (05.25 per cent) had perfect posture.

2. The total deviations before instruction were 911, or 3.96 deviations per student. Total deviations after instruction were 453, or 2.31 deviations per student. This shows that approximately one half of the total deviations found before instruction were eliminated by educating the students in what constituted good posture and by the administering of corrective exercises.

It should be noted that a total of 422 out of the 911 deviations were first degree (slight), which may have been an influencing factor in making correction possible during the three month period. Furthermore, fewer students were examined at the time of the second screening, because those who participated in Spring sport activities were not required to take Physical Education and therefore, were not available for screening. This fact should be considered when comparing total deviations. This variable has no effect, however, on the "average deviation per student."

CHAPTER VII

SUMMARY AND RECOMMENDATIONS

Summary. There is sufficient evidence contained in this research to enable the author to arrive at the following conclusions:

1. There is a definite need for a posture correction program in the Freshman and Sophomore boy's classes at Missoula County High School.

2. The simple and efficient screening techniques used in this study are adequate in the recognition of posture deviations.

3. Postural deviations can be improved and/or corrected by educating the students as to what constitutes good posture, and by administering standard corrective exercises.

4. The interest and cooperation of the students, in dealing with a posture program, can be gained.

5. Pictures of posture deviations are valuable evidence to students and parents in soliciting their acceptance and cooperation of the corrective procedure recommended.

Recommendations. As the conclusion of this study, the following recommendations are offered:

1. Posture training should be an integral part of the Physical Education program in every elementary and secondary school.

2. Each member of the faculty should be instructed as to the value of good posture, and what constitutes good standing, walking and sitting posture. Their assistance in coping with the posture problem can be valuable and should be solicited.

3. Medical approval of the corrective program is necessary. Therefore, the services of a physician should be obtained to recommend and approve the proper follow-up treatment of posture deviations.

4. An attempt should be made to make good posture habitual with every student. In order to accomplish this, students must be thoroughly instructed as to what good posture is, and its value.

5. A postural record should be on file. Each student should be screened at least twice during the school year. This offers the instructor an opportunity to evaluate the posture training program and to note any lack of progress in individual cases.

6. Exercise may not always be the solution to poor posture. It is important that the cause be removed before any correction is attempted.

7. The time allotted during school hours will not be sufficient to correct many deviations and the student will be required to perform exercises in his home. Therefore, it is important that the parents be advised as to the nature of the deviations and why the specific exercises are recommended. The assistance of parents can be an important factor in determining the success of the program.

8. It is the author's opinion that the large number of scoliosis and forward head deviations detected, may be caused by desks that are not properly adjusted to the size of the student. Further research is recommended into the possible correlation between the cause of poor posture and school seating facilities, poor study habits and improper lighting.

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