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Posture and Body Mechanics  
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# UNIVERSITY OF IOWA EXTENSION BULLETIN

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## POSTURE AND BODY MECHANICS

by

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Department of Physical Education  
for Women

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STATE UNIVERSITY OF IOWA, IOWA CITY, IOWA

Bulletin No. 479

BRUCE E. MAHAN, PH.D., EDITOR

March 1, 1940

Issued semi-monthly throughout the year. Entered at the post office at Iowa City, Iowa, as second class matter under the Act of October 3, 1917.

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This bulletin is presented as a guide to the teaching of general fundamentals of posture and good use of the body in movement. It has been planned primarily from the standpoint of teaching the young girl in high school or college, although the underlying principles included with respect to posture, and the exercises, are applicable to younger girls—and boys—as well. They would however have to be motivated on a different basis.

## POSTURE AND BODY MECHANICS

The present day emphasis on the value of personal appearance as an asset in the social, business, and professional world has placed the development of good body mechanics in a place of increasing significance. Body mechanics, a term gradually replacing posture, includes the body in motion as well as in positions of standing and sitting. In the multitude of contacts which each person is making in his work today, first impressions inevitably become a most important factor in determining the subsequent course of events. Physical poise and an alert, graceful, easy, carriage contribute much toward inspiring confidence and interest on the part of others.

"Mechanics," when used with respect to an automobile, refers to the quietness, smoothness and efficiency with which it works. To improve the mechanics of a car may be a relatively simple matter, depending perhaps on lubrication, or the mechanical adjustment or replacement of worn parts. "Mechanics," when applied to the human body, is related in the same way to the manner of its functioning. When there is the best alignment and balance of body parts, when movement is free, smooth, and well controlled, then strain and fatigue are lessened, efficiency is increased, and the aesthetic ideal is approached.

There are some persons whose body mechanics are naturally good. But there is a larger group whose habits have developed along the lines of least resistance, resulting in zig-zag lines and inefficient, often awkward, movement.

### WHY ARE GOOD BODY MECHANICS IMPORTANT?

There are three fundamental relationships upon which the importance of good body mechanics may be based:

#### 1. Aesthetic value

There is no question as to the value of good carriage from the standpoint of personal appearance. Clothes look better. There is an aspect of alertness, confidence, and poise which is so often lacking in the individual with poor posture. Physical poise then becomes an asset in any social situation. In the professional or business world it adds to one's ability to make desirable, favorable impressions, so necessary to creating further opportunities.

## **2. Psychological value**

Psychologists are increasingly interested in the posture of the individual as related to his attitudes toward himself and toward life. Many believe that the development of physical poise is the first essential in the development of the poise of the complete individual. Certain postures express certain moods. Fear, indifference, despondency call forth definite mental pictures of body attitudes. On the other hand, joy, courage, and hope present those which are a marked contrast to the above. Of course, it cannot be said that these are inevitable concomitants of good and of poor body carriage. However, the age-old advice "Keep your chin up" in the face of discouragement and despair is based on a sound principle of mental hygiene.

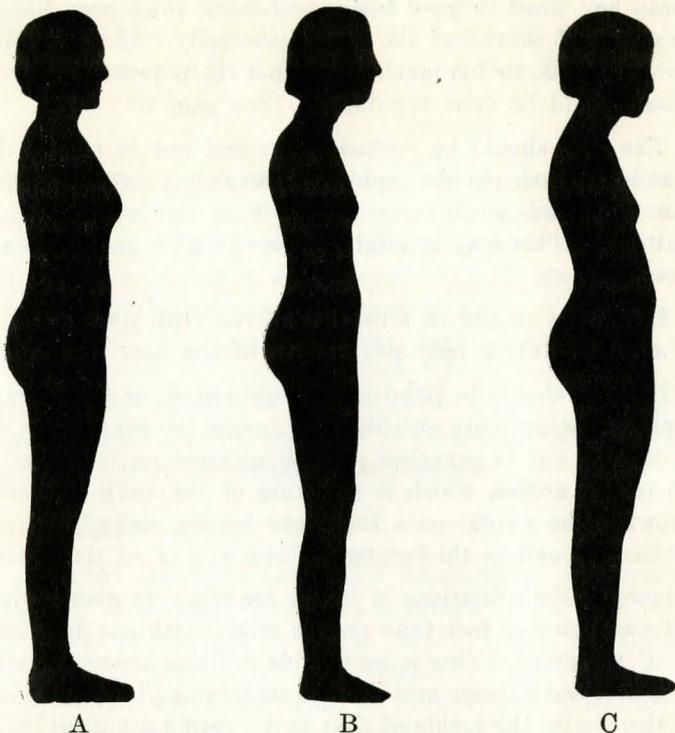
## **3. Health value**

Poor posture is, in some cases, a primary cause of poor health. In most cases, however, poor posture, while not the causative factor, exists as a definite liability at times when the body needs every asset at its command to combat some condition of ill health. For instance, heart and lung weaknesses should not have to work against the added handicap of a crowded and inflexible thorax. Disturbances in function of the organs of the abdomen and pelvis may be aggravated, or even caused, by habitual poor body position and weak musculature. Constant poor posture plays an important part in the production of chronic joint strains, and of arthritis, especially of the lower back, knees, and feet. It is in the younger, habit-forming years that liabilities along this line should be prevented.

## **WHAT IS GOOD BODY MECHANICS?**

The best way for one to start to improve his own carriage is to look at himself in a full length mirror, preferably with all clothing removed, and check with respect to the points listed below.

The generally accepted and most desirable standing position emphasizes lining up the movable parts of the body in as perfectly balanced a whole as possible. The center of the hips, of the trunk at the shoulders, and of the head are in an approximately direct line over the center of the arch, or weight bearing part of the foot (heel to ball). In other words a vertical line from this point on the foot passes just behind the knee cap, through the center of the hips, through the tip of the shoulders, and the lobe of the ear. See Fig. 1A.



- A. EXCELLENT BALANCE AND ALIGNMENT  
B. GENERAL "SLUMP". NO INCREASE IN LOWER BACK CURVE  
C. VERY POOR ALIGNMENT. INCREASED HOLLOW IN LOWER BACK

Proceeding from the general to the specific, a good standing posture includes the following:

1. *The head* should be easily erect, the lines of the chin and neck forming an approximate right angle.

2. *The upper back* normally should have a slight degree of roundness. The chest should be easily high, without being forcibly thrust out, and the shoulders low but not forward, arms hanging relaxed at the sides of the body, not toward the front. "Chest out!" and "Shoulders back!" are obsolete since they result in an overtense, unlovely position and usually produce an increase in the hollow of the lower back as well.

3. *The lower abdomen* should be flat, e.g., lower end of sternum (breast bone) should be more prominent than lower abdomen. "Lower abdomen controlled at all times" may be taken as perhaps

the main key word to good body mechanics, since here lies much of the secret of control of the rest of the body. If the abdominal muscles are weak, or too much abdominal fat is present, abdominal exercises should be done regularly. (See page 9)

4. *The hips* should be tucked under but not to such a degree that the lower back (lumbar spine) is completely flattened. Normal structure demands some curve or hollow in the lower back above the buttocks. This may be slightly more in girls and women than in boys and men.

5. *The knees* should be straight but not stiff, nor locked backward with a resulting ugly prominence of the calf.

6. *The feet* should be pointing straight ahead, or nearly so, with the weight resting more outside than inside the center line of the foot. Toeing out is graceless as well as hard on the feet. Pronation of the ankles, which is a rolling of the ankle inward, due to throwing the weight onto the inner border, definitely weakens the arches, as well as thickening the appearance of the ankles.

In many social situations it is the tendency to stand with the weight more on one foot than on the other, with one foot slightly ahead of the other. This is acceptable and harmless *if* the above elements of good balance and line are maintained and if the weight is not thrown on the inside of that foot. Avoid allowing the body weight to sink down on the weight-bearing side, thus thrusting that hip into ungainly prominence. This is important for everyone, but especially for persons who appear before an audience, such as public speaking, reading, singing, and presiding before a group.

### SHOULD ALL INDIVIDUALS BE JUDGED ALIKE?

Mention should be made of some factors that are to be considered with respect to individuals.

#### 1. **Body type**

There are three hereditary types of body build, the lithe or slender type, the stocky type, and the intermediate type. The factors listed above are of equal importance for all types, but it is important to avoid setting up exactly the same *ideal* for all types. For example, the stocky type will have more abdominal fat which is consistent with his generally greater fat distribution. A normally rounded contour should not be confused with relaxed abdominal muscles. In the normal a line connecting the upper and lower

abdomen will be vertical or directed slightly back and downward. See Fig. 1 A. If the muscles are relaxed such a connecting line will slant down and forward. See Fig. 1 B and C.

## 2. Age

The young child cannot be judged upon the same bases as the pre-adolescent, the adolescent, or the young adult. It is normal for the child of 5 to 6 years, or younger, to have a certain amount of abdominal prominence, slight prominence of the shoulder blades, and a lower back that appears somewhat more hollow than that of the older child. He should, however, have plenty of good, general, vigorous exercise to counteract these tendencies, and to help in his normal development to a more adult posture. Through plays and games, such natural activities as climbing, reaching, creeping, bending, and hanging should be emphasized.

## 3. Flexibility

Limited flexibility presents a handicap to the correction of faulty body mechanics. When this is present in the hips, shoulders, or feet, it is usually due to a slight shortening of certain muscles, which can be stretched out with regular, not too vigorous, stretching. However, when this exists in the spine, in a marked roundness of the upper back which cannot be straightened with effort, it is more apt to be due to bone structure. As such it is a matter of time and long-continued effort to bring about any noticeable change, and then only when it is treated during the years of growth. If the posture is good with respect to balance of body parts, and the muscle tone is good, the individual can be judged on that basis. When, however, this is accompanied by generally poor posture, these individuals should consult an orthopedic specialist if possible.

### HOW CORRECT FAULTY STANDING POSTURE?

A. Use a mirror. *See* good and bad first, then *feel* it.

B. Stretch body as tall as possible.

C. Practice flattening lower abdomen, being sure that chest is not forcibly raised at same time. There should be a definite feeling of tension, of tightening, in the lower abdominal muscles as this is done. One should be able to hold this to a moderate degree regardless of breathing, talking, walking etc., if it is correctly done.

D. Assume both good and poor positions as follows in order to recognize when each is present:

1. Raise both shoulders into a hunched position, and lower; repeat. Now draw shoulders forward, then forcibly backward and downward. Finally assume the best position with shoulders low and easily back, as if weights at lower tips of shoulder blades were pulling them down and back, but with no strain.

2. Let the chest sink down. Notice how the head and shoulders move forward, and how the back rounds. Keeping shoulders relaxed, slowly straighten with a final easy lift of the chest. This should not be strained nor be produced by taking and holding a deep breath. Note that the head and neck and shoulders naturally fall into an easy, good position.

3. Thrust head straight forward, localizing movement above shoulders, then draw straight backward toward imaginary collar button, keeping the chin at same level throughout, e.g., do not tilt it up in air, nor pull it down toward chest. An habitual forward head and neck may also be helped by a feeling of being lifted toward the ceiling by the bones just behind the ears.

4. Hollow lower back, thrusting buttocks backward and abdomen forward. Then contract buttock and abdominal muscles to bring the lower back into a position of only moderate hollow. It is especially important to remember in this connection that the *lower back should not be flat*. Many individuals who normally have a good standing posture over-hollow the lower back under some conditions as, for instance, when they wear high heels, after they have been standing for a long time, when they raise their arms for any purpose, and in other situations which tend to produce that effect. Excessive hollowing, as well as over flattening, places a strain on the joints and muscles of the lower back and is a frequent cause of fatigue and pain in that region.

If a person habitually over hollows the lower back, as in Fig. 1 C, (and it should be borne in mind that this is judged by contour of the lower *spine*, and not by size or prominence of the buttocks) and finds difficulty in learning to correct it, it may be practised as follows: Stand with the back to the wall, heels out about three to four inches, shoulders and head against wall; push the lower back against the wall and tuck the hips under. It may be necessary actually to bend the knees at first in order to produce the result.

Flattening should normally occur to within less than an inch of the wall (about the thickness of the hand), with the knees straight, but not stiff and with no movement of the shoulders and upper trunk.

## EXERCISES FOR STRENGTHENING MUSCLES\*

### I. For strengthening abdominal muscles

#### 1. Abdominal retraction

Lie on floor with knees bent, feet on floor, tense the abdominal wall, especially the lower part, to flatten it as much as possible; hold, then relax. The chest should move only slightly if at all. If this seems difficult, it sometimes helps to try to draw the two hip bones together in front, though they cannot actually be moved. 15 - 20 times.

This should also be done in other positions, as sitting and standing. When correctly done, it should be possible to maintain a position of moderate retraction of the lower abdomen indefinitely with no discomfort. The final aim, of course, is that it should become habitual.

#### 2. "Rocking Chair" exercise

Lie on back, legs straight, arms stretched overhead: 1. rise quickly to sitting position and reach forward to touch toes, keeping knees straight; 2. return to straight sitting and stretch up as tall as possible, arms straight forward at shoulder level; 3. round back and roll down to lying position, raising arms overhead. Even rhythm. Work gradually up to 10 - 15 times daily.

#### 3. "Nutmacker" exercise

Lie on back, legs straight, arms straight out at shoulder level, palms down: 1. raise right leg to vertical, knee straight; 2. swing leg over to left, touching toe lightly to floor as near left hand as is possible with both knees straight; 3. return leg to vertical; 4. lower leg, heel touching floor lightly. Shoulders do not leave floor throughout. This is also a good hip exercise. Work up to 10 - 12 times to each side.

4. Lie on back with knees bent, feet flat on floor, hands under neck: 1. bend both knees to chest; 2. straighten knees to bring legs

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\* In doing all exercises, regardless of position in which they are done, the faults mentioned above, such as hollowing the lower back, thrusting the head or shoulders forward, should be avoided when not a necessary position in any part of the exercise.

to a vertical position; 3. lower straight legs to about 45° angle or more; 4. bend knees to put feet on floor. It is very important that the lower back not be excessively hollowed at the beginning or end of this exercise. Work up to 10 - 15 times.

## **II. For strengthening muscles of upper back, shoulders and neck**

1. Sitting (or standing) with head relaxed forward, chin on chest; slowly raise head to natural level, then slowly but forcibly draw head and shoulders straight backwards, as if against imaginary collar button. Do not tilt chin up, nor pull chin in toward chest. 8 - 10 times.

2. Lie on face, hands clasped low behind back, elbows straight: slowly pull head and shoulders off floor, pinching shoulder blades together and pulling down with hands; hold for 5 - 6 seconds, then relax. Feet remain on floor. Avoid tilting chin up in the air by keeping eyes directed toward the floor. Do not see how far you can bend backwards as this merely produces extreme hollowing of the back. Work up to 8 - 12 times.

### **3. "Breaking chains"**

Sit on floor with legs crossed, "tailor" fashion, and bend arms to bring clenched fists in front of chest, palms down, elbows at shoulder level: slowly pinch shoulder blades together as if attempting to break a chain held in the two hands. Keep elbows at shoulder level, shoulders low, and avoid thrusting the head forward. 10 times.

4. Sit on floor with legs crossed, fingers touching top of head, elbows well back: stretch throughout trunk, pushing up against hands; then relax. Avoid "hunching" shoulders.

## **III. Exercises for flexibility and general strengthening**

1. Stand with feet slightly apart, abdomen well controlled: keeping knees straight, let trunk fall forward, arms relaxed, touching floor with hands; bob a few times, going down farther each time; then straighten trunk all the way up and repeat.

2. Stand with feet slightly apart and with hands clasped high overhead; bend slowly from one side to the other, keeping head back and abdomen and lower back in a good position. Hips move only slightly from side to side, most of movement coming throughout spine.

### 3. "Airplane" exercise

Stand with feet apart and arms out at shoulder level, elbows straight and palms down: 1. twist trunk to the left; 2. keeping knees straight, bend to touch the left toe with the right hand, the left hand pointing toward ceiling; 3. straighten to twist position, arms at shoulder level; 4. return to position with trunk facing forward. Repeat to right side. Knees straight, heels on floor throughout. Work up to 10 times each side.

### 4. Stretch walking

With hands clasped overhead and slightly forward, walk on tiptoes, whole body in as straight a line as possible. Avoid thrusting head forward, hunching shoulders, hollowing back, or stiffening knees. Try to carry over this "lift" into ordinary walking.

## IV. For strengthening muscles of feet and ankles

1. Stand with feet parallel and about 2 inches apart: keeping toes and heels on floor, lift arches, throwing ankles apart and weight onto outer border of feet.

2. Walk with weight exaggerated on outer border of feet, letting heel come down first in natural manner and carrying weight through to ball and all toes. Then do the same to a moderate degree in a way that can be carried over into walking habits.

3. Rise as high on toes as possible; lower weight slightly toward outer borders of feet, keeping toes on floor. Avoid throwing ankles either in or out on rising.

4. Walk as high on toes as possible, ankles straight.

5. Pick up small objects under toes, and lift them to at least knee height to place them in the opposite hand.

For additional exercises see: Drew, Lillian, *Adapted Group Gymnastics*, Lea and Febiger, Philadelphia.

## WHAT IS GOOD SITTING POSTURE?

Sitting is the next logical factor to consider. The same principles of line and balance may be applied. The hips should be well back in the chair so that the weight is borne on the hip bones and not on the lower end of the spine; the lower abdomen remains con-

trolled; and the upper trunk is approximately over the hips. If the chair fits, use the back for support. Stiffness throughout the spine is almost as undesirable as the well-known "slump" with its rounded back and depressed chest. Muscles maintained on a stretch, as over a badly rounded back, are under strain. This position also crowds the heart and lungs and abdominal organs.

When sitting at a table, for instance, in writing, studying, playing cards, eating, it is often necessary to lean forward. Let the lean come from the hips, that is, way down where the thighs and trunk meet, and not at the waist, which rounds the back and thrusts the head forward in an ungainly manner. If the elbows are on the table, they should be close together, near the edge, and should not be allowed to force the shoulders up toward the ears! The best way to avoid fatigue while sitting for a long period of time is to: (1) avoid unnecessary strain, as above; (2) use support for the back when possible, e.g. the chair back, or a small pillow in the small of the back; and (3) change position frequently.

When being seated, walk up to the chair, turn away from the foot which is nearest the chair, and, keeping the hips well under, bend forward slightly from the hips, and lower the weight. Balance and control are maintained by the position of the feet, one slightly ahead of the other. In rising from a chair, the process is reversed. The push comes from the rear foot, which is slightly under the chair, and as the body is lifted, the weight is transferred to the forward foot. Avoid too much forward bend. Avoid thrusting the hips backward conspicuously. The arms take no active part, except in rising from a low upholstered chair or davenport, when it is often necessary to push with the hands. In such a case, however, avoid hunching the shoulders.

Remember there are times to lounge, but there are also times when "sitting up" is a matter of good taste and courtesy. The secret of effective lounging is relaxation, which means adequate support under the whole back, as with pillows behind the back or lying down.

#### **WHAT IS GOOD BODY MECHANICS IN WALKING?**

Good alignment and balance, abdominal control, lift—all the elements important in standing are necessary to a good walk. The weight is carried more toward the balls of the feet in direct proportion to the speed of one's walking. The feet point relatively straight ahead and the weight is transferred from the heel to the

whole ball of foot, through a line outside the center. This avoids pronating the ankles. The heel comes down only a fraction of a second before the rest of the foot. That walk is smoothest and most rhythmical that is the best combination of relaxation and control, controlled abdominal and buttock muscles, control that lifts the weight off the feet and prevents it from sinking down into the hips, relaxation that produces a free swing of the leg in the hip joint, and freedom from tension in the shoulders with a resulting easy but not extreme swing of the arms below the shoulders and at the sides.

Walking with a book on the head is advocated by many for the development of poise and good line in walking. However, the difficulty of balancing a hard, flat object on the head often produces undesirable positions. Interposing a small, soft pillow between the two helps eliminate this. A soft, weighted object such as a 2-3 pound sandbag is ideal. It is essential that the head especially be in a good position when the object is placed on the head.

## ESSENTIALS OF GOOD BODY MECHANICS IN MISCELLANEOUS ACTIVITIES

### 1. On Stairs and Hills

In going up stairs and low hills the body weight is carried more over the forward foot. However, any forward lean comes from the ankles, and not from the hips, except on very steep inclines. There is a strong push up from the toes with a straightening of the ankle, of the knee, and of the hip. This is effective in preventing excessive hip movement from side to side, which is un-gainly, and which results from merely lifting the knee and turning the hip to set the foot on the next step.

In walking down stairs at the usual moderate pace, the body weight should be lowered with control from one foot to the other, rather than a relaxed dropping from one step to the next. The former produces a light step as well as smoothness. In *running* downstairs, lightness and relaxation are important.

Walking down hill is slightly different in that it is often necessary to lean back slightly from the ankles; do not lean from the waist nor throw the hips out in front. The steps are usually shortened, and it may help not to straighten the knees entirely in order to keep the weight back.

### 2. Running, Jumping and Similar Activities

In such activities as running and skating the body weight

is well forward for speed. In skating this is especially important as a safety measure to avoid severe tumbles backward.

In any activity in which the body weight is suddenly received upon the foot or feet, it is important to avoid foot, knee, and general nervous strain by landing lightly with an easy give in the ankles and knees. The toes touch first, *then* the ball of the foot. Landing on the ball first, or on the whole foot, or suddenly stiffening the joints inevitably produces strain. And, needless to say, it gives an awkward appearance.

### **3. Picking Up and Carrying Articles**

Stooping to pick up a light article, as for instance, a tennis ball, or a heavy article to be carried in one hand, as a suitcase, is best done by bending the knees, one foot slightly ahead of the other, with only a slight bend forward in the hips. Keep the hips easily under the trunk rather than thrusting them out in back. This not only has a more graceful appearance, but, when done frequently, is measurably less tiring than bending over from the hips with the knees straight, as it uses the large muscles of the legs and hips and lessens the work of the back muscles.

In picking up a heavy object with both hands, as for instance, a small child, it is even more important to bend the knees in order to lessen back strain. The lift should be in as much of a straight, upward line as possible in order not to waste muscle energy and to minimize back strain. Carrying heavy objects should not be allowed to drag the shoulders forward. The muscles that pull the shoulder blades together should be used, both to lessen fatigue, and to avoid undesirable effects on upper trunk position.

### **4. Pushing and Pulling**

The most effective push and pull occurs when it is made with the body weight as nearly as possible in a line with the direction in which the object is to be moved. In other words, avoid wasting energy pushing *down* on a davenport from above, pushing *up* on a window from a position a foot away.

### **5. Reaching Overhead**

When reaching up, as for instance, to a high shelf, avoid thrusting the abdomen and hips forward and hollowing the lower back.

### **6. Dancing**

Everything that has been said about walking may be related

to dancing. Good line, getting the weight off the feet, controlled balance, and relaxation are the best assurance of tirelessness and loveliness in a dancer.

#### **7. Relaxation**

There is no one factor more important in the conservation of energy than the ability to relax, throughout the whole body, or in those parts which are not needed for the matter at hand. The best way to learn to recognize whether a part is relaxed or not is to tense it consciously and then let it go, trying to register the difference in feeling of the two states. At first this can perhaps be practised best lying down, alternately tensing and relaxing first the whole body, then separate parts.

Driving a car, writing, dancing, typing, there is no activity or occupation in which relaxation is not of primary importance both as an asset to skill and as a means of lessening fatigue.

### **REDUCING**

Reducing in the real sense is a matter primarily of diet, and, except in the most conservative form, should be undertaken only under the supervision of a physician.

Exercise to tone up slack muscles is important, and if done daily with enthusiasm and vigor may help to reduce localized fat to a certain degree. Any of those exercises listed as abdominal and general strengthening are useful in this respect if done in the manner described above.

### **IS EXERCISE DESIRABLE DURING MENSTRUATION?**

It is quite generally agreed today that it is desirable for the young girl or woman to lead as normal a life as possible during her menstrual period. There are exceptions, of course, some individuals having such severe pain that to continue regular routine is impossible. However, the psychic effect of thinking of the monthly period as a time of "sickness" when daily routine must be altered is not inconsiderable.

It is true that during the years of puberty the girl who has symptoms of abnormal menstruation, namely, pain or heavy flow, should not be urged to participate in strenuous activity such as basketball, track, field hockey, soccer etc. during the first two or three days of her period.

Persons who do have pain regularly, or who are excused at that time from physical education classes involving unusually strenuous

activity, may do the following exercises to their advantage. If they are done faithfully every day, they may usually be expected to minimize or actually correct painful menstruation in those cases in which no definite cause has been diagnosed.

1. "Abdominal Pumping"

Lie on back, knees bent, feet flat. This is a slow, smooth, rhythmic raising and lowering of abdominal wall by (1) strong contraction of abdominal muscles with little chest movement, and (2) relaxing, and then pushing abdominal wall up as far as possible without strain. 20 - 30 times a day.

2. Double knee circling

Lie on back, knees bent, feet flat on floor: lift feet off floor, draw knees upward on right, move slowly across abdomen to left, exerting pressure if necessary, by holding firmly with hands clasped around knees: straighten knees so that legs are at about 45° angle with trunk; repeat without bringing heels to floor. For progression gradually straighten hips more as knees are straightened, but avoid hollowing back.

3. Prone knee-chest exercise.

Take a position on hands and knees, knees slightly separated, hips directly above knees and shoulders directly over hands, elbows straight, fingers pointing inward. Bending elbows outward, slowly lower *chest* to floor, not head; draw hips back toward heels, straightening elbows; slowly circle trunk upward and forward, with a strong contraction of abdominal muscles. Repeat 10 - 15 times.

4. Prone knee-chest position. Mid position of preceding exercise—chest, forearms resting on floor, chest as low as possible and hips directly over knees—to be held 5 - 10 minutes a day.

5. Prone-knee chest position as in 4. Stretch left leg backward and upward until it is in a straight line with trunk; hold, then return to position. Repeat with right leg. 10 - 15 times each side.

6. Lie on floor (or bed if at home) with hips against the wall and legs up the wall. Walk up the wall as far as possible, until weight is resting on head and shoulders; hold a few seconds; lower hips and legs, and repeat.

7. Stand with hands on hips; or with arms raised forward at shoulder level. Slowly bend knees, heels coming off floor, to a squat position sitting on heels; slowly straighten. Let knees spread slightly. Work up to 8 - 10 times.

Suggested references:

- Drew, Lillian — *Adapted Group Gymnastics* — Lea and Febiger, Philadelphia, 1927  
Glassow, Ruth — *Fundamentals of Physical Education* — Lea and Febiger, Philadelphia, 1932  
Lane, Janet — *Your Carriage, Madam!* — John Wiley and Sons, New York, 1934  
Jacobsen, Edmund — *You Must Relax* — McGraw-Hill Book Co., 1934

## BODY MECHANICS INVENTORY\*

Check the characteristics which pertain to you.

### Standing Posture

Head: Easily high..... Forward.....  
Shoulders: Easily back..... Forward..... Stiffly back.....  
Abdomen: Controlled..... Relaxed.....  
Lower back: Normal hollow..... Too hollow..... Flat.....  
Knees: Straight..... Locked backward..... Bent.....  
Feet: Toe straight ahead..... Toe out..... Toe in.....  
Ankles: Straight..... Pronated.....  
Appearance as a whole: Poised and alert..... Tense.....  
Too relaxed.....

### Sitting Posture

(Consider the position you assume in the average social or classroom situation.)

Hips: Well back in chair, bearing weight..... Forward, spine bearing weight.....  
Back: Easily erect..... Rounded.....  
Abdomen: Controlled..... Relaxed.....  
Legs: Crossed..... Together..... Apart.....  
Sit down: Smoothly..... Awkwardly.....  
Rise from chair: Smoothly..... Awkwardly.....

### Walking Posture

Head: Easily high..... Forward.....  
Shoulders: Easily back..... Forward..... Stiffly back.....  
Arms: Swing easily..... Swing vigorously..... Stiff.....  
Hips: Controlled..... Swing sideways.....  
Feet: Toe straight ahead..... Toe out..... Toe in.....  
Walk as a whole: Smooth..... Stiff..... Too relaxed.....  
Further Description .....

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\* Adapted from "Posture Inventory"—Building Your Personality, Hattie M. Marsh, Prentice-Hall, Inc. By permission of author and publisher.

## IOWA POSTURE TEST\*

### TECHNIQUE OF ADMINISTERING TEST

The class is divided into groups of ten or twelve. Each group is sitting in a row of chairs or stools about two feet apart, facing forward, or each chair turned at a 45 degree angle to enable the pupil to rise and walk away from her chair. The names are entered in order of the chart, and the group keeps its original order throughout the test. The group is preferably dressed in bathing suits. For inexperienced classes, the correct mechanics of each item may be briefly explained before testing, depending upon whether the examiner wishes to see what they habitually do or what they can do.

#### A. Foot Mechanics

The examiner takes a position at the side, and each girl in turn walks out toward her and back again while she is checked on toeing straight ahead and presence or absence of pronation.

#### B. Standing Position

The group stands at one side of the row of chairs, and the examiner passes down the line checking correct alignment of body segments. If time is short, this may be omitted and all checking of body alignment may be done in walking. (See "C")

#### C. Walking

Five or six at a time walk around the row of chairs, some 5 or 6 feet between each two girls. The examiner stands so as to obtain a side view of the group and checks for correct alignment of body segments and lack of stiffness.

#### D. Sitting

With the group sitting on the stools or chairs, the examiner checks the sitting position of the first girl. Then the girl rises and walks forward a few steps, turns, returns to her chair, and is

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\* This test has been found a satisfactory motivating device in work with girls. It cannot, however, be used as an accurate measure of individual postural faults.

seated. After grading this movement, the examiner goes on to the next girl.

**E. Stooping to Pick Up Light Object**

Each person in turn picks up a small object from the floor, walks a few steps, and places it on the floor again. If time permits, it gives a more natural picture if she walks to and from this point.

**F. Ascending and Descending Stairs**

Each girl is checked as she ascends, then descends some 8 to 10 stairs.

**CRITERIA AND METHOD OF SCORING**

**A. Foot Mechanics**

<b>I. WEIGHT DISTRIBUTION</b>	Score	
This is normal, or pronation is absent, if there is:	No pronation	3
1. No bony bulge in front of and below inner ankle bone.	Some pronation	2
2. No <i>marked</i> prominence of inner ankle bone.	Marked pronation	1
3. No outward turning of heel cord below ankle height.		
<b>II. DIRECTION OF FEET — Toeing</b>	Score	
straight ahead or toeing out	Feet normal	3
1. A very slight angle of toeing out is considered normal.	Moderate toeing out	2
2. Feet toeing in is usually a strong position, though unattractive.	Marked toeing out	1
Due to the shape of the feet, it is more accurate to judge this from in front.		

**B. Body Mechanics in Standing**

<b>I. CORRECT ALIGNMENT OF BODY SEGMENTS</b>	Score	
1. General axis of head and neck, trunk, and legs approximating a straight line	Correct alignment	3
2. Head and neck erect (may be <i>slightly</i> forward)	Slight general deviation or moderate deviation of one part	2
3. Chest high, giving appearance of elevation and lift	Marked general deviation	1

4. Normal curves in spine — a slight roundness of upper back (above buttocks)
  5. Lower abdomen flat
  6. Ease and balance throughout.
- Note deviations from normal on chart by abbreviations: e.g., abdomen, abd.; upper back, u.b.; etc., for later use in conference with student.

### C. Body Mechanics in Walking

- |  |       |         |
|--|-------|---------|
| <b>I. CORRECT ALIGNMENT OF BODY SEGMENTS</b> | Score |         |
| Check on any changes from standing position. |       | 3, 2, 1 |
| Record stiffness, if present.                |       |         |

### D. Body Mechanics in Sitting

- |   |                          |   |
|---|--------------------------|---|
| <b>I. SITTING POSITION</b>  | Score                    |   |
| 1. Upper trunk well balanced over hips  | Correct position         | 3 |
| 2. Head erect   | Some degree of deviation | 2 |
| 3. Chest easily high (Not thrust out)   | Marked deviation         | 1 |
| 4. Shoulders well back, but not stiff   |                          |   |
| 5. Abdomen controlled   |                          |   |
| 6. Normal upper back curve  |                          |   |
| 7. If good chairs are used, hips should be well back, back of chair for support.  |                          |   |
| <br><b>II. RISING FROM SITTING POSITION</b>   | <br>Score                |   |
| 1. One foot slightly under the chair with the other a little in advance, trunk bent slightly from the hips, push up from feet | Good performance         | 3 |
|   | Fair performance         | 2 |
|   | Poor performance         | 1 |
| 2. Arms relaxed   |                          |   |
| 3. Hips kept well under body  |                          |   |
| 4. No stiffness   |                          |   |
| <i>Being Seated</i>   |                          |   |
| Same general picture as above, reversed.  |                          |   |

### E. Stooping to Pick Up Object

		Score
1. Feet and hips well under body weight, one foot slightly ahead of other	Good	3
	Fair	2
	Poor	1
2. Bend knees, with some forward bend from hips		
3. Abdomen controlled (allow slight easy rounding of back to avoid stiffness)		
4. Arms relaxed		
5. Smooth movement, balance maintained throughout		
6. Pick up object outside or only slightly ahead of foot		

### F. Ascending and Descending Stairs

I. ASCENDING		Score
1. Weight only slightly forward, and from ankles (not hips)	Good	3
	Fair	2
	Poor	1
2. Straight push up from ankle and knee, avoiding sideward swing of hips		
II. DESCENDING (normal speed)		Score
1. Controlled lowering of weight on- to forward foot (not a relaxed drop)	Good	3
	Fair	2
	Poor	1
2. Smoothness (avoid bobbing)		



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