10-1968

Your Work and Your Posture

Katherine H. Sippola

EC 666

Your Work and Your Posture

YOUR WORK AND YOUR POSTURE

The most important single piece of equipment that you, as a homemaker, will use in accomplishing your work is your own body. Just as your understanding of an automatic range or dishwasher will lead to greater skill and efficiency in its operation, so some understanding of the mechanics of your body will help you use it more effectively.

Wise use of your body will eliminate or minimize physical strain that might cause injury; at the same time, it will help you accomplish work more quickly.

Gradual development of the body from its original four-footed to its present two-footed posture has brought certain disadvantages along with advantages. For one thing, the internal organs are suspended from the backbone like a flag from a flagpole. Our four-footed friends have theirs suspended like the wash from a clothesline, a more effective arrangement since their organs have support in line with the force of gravity.

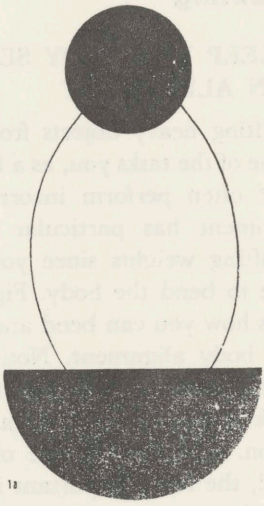
The spinal column is an important structural unit in the body. The head is balanced upon it, or should be balanced, not hung. The arms and legs, suspended from the spinal column, subject it to severe pulls and strains. For the jobs it has to do, the spinal column must be exceedingly strong and yet flexible enough to permit free movement. In addition, it encloses and protects the sensitive, vital spinal cord, which provides for incoming and outgoing nerve roots throughout its entire length.

The spinal column is shaped like an elongated S which absorbs the jars of walking and working better than a straight column. The spinal column is made up of about 33 separate bones called vertebrae. The lower vertebrae are much heavier than the upper ones and, therefore, are able to support the greater weight they must carry. Only slight movement is possible at each joint in the spinal column, but the total effect of the many joints is great strength and freedom of movement.

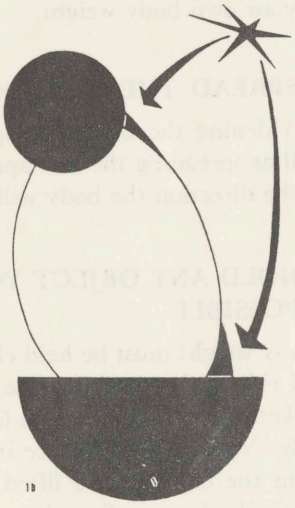
Small muscles up and down the spine connect all the vertebrae and control the movement of the flexible spinal column. These small muscles are strengthened through proper exercise, which gradually increases their capacity to do the work required of them. Continuous or frequent "all-out" contractions or straining, however, will cause loss of elasticity in these small muscles and will result in pain and local fatigue in the lower back.

The spinal column has discs of fiber and cartilage between each vertebrae. These discs act as cushions at each joint and are effective shock absorbers as you work and move. Lifting heavy loads with the backbone curved causes these cushions to be flattened excessively along the inner curve of the backbone. Permanent damage may be brought about by such flattening of these discs.

BODY ALIGNMENT



Figures 1 a and b are representations of the body divided into the three main weights—the head, the chest, and the pelvic or hip section. Proper alignment (figure 1 a) locates in a vertical arrangement the first two weights over the base of support, the third weight. In this balanced position, the muscles can maintain good posture with a minimum of strain and effort whether yo are working, playing, sitting, standing, walking, or climbing. Obviously, however, you cannot accomplish all your work with your body in this straight, erect position. You must do countless jobs of lifting and carrying each day.



Whenever these weights are out of alignment (figure 1 b) the force of gravity tends to increase their mi alignment. This force, combined with the weight of the misaligned body, causes the muscles to contract constantly to keep the body from toppling over. Constant contraction of the muscles results in local fatigue, particularly at the base of the neck and in the lower back where most of this weight must be supported.

Changing your position will prove restful when it is necessary for you to stand or sit in one place for a long period of time. Misaligned body positions for a short period of time are not harmful and will allow some muscles to relax. These positions must be used *for change only*, however, since the well-aligned body should be the basic position, not only when standing and sitting but also during activity. Selecting a good height for work surfaces, either when standing or sitting, is an additional help in maintaining proper body alignment.

Knowledge of the principles of good body alignment and good work heights is, however, only the first step in acquiring a habitually efficient posture. Persistent practice, along with a desire to make this a part of one's life, is essential if a well-aligned body is to become a habit.

Effective Use of the Body in Lifting


2

- KEEP THE BODY SECTIONS IN ALIGNMENT

Lifting heavy objects from the floor is one of the tasks you, as a homemaker, most often perform incorrectly. Body alignment has particular significance in lifting weights since you obviously have to bend the body. Figure 2 indicates how you can bend and still maintain body alignment. Notice that the head is directly over the chest and the trunk bends forward from the pelvic region. The heavier the object to be lifted, the more important it is for you to maintain correct body position since you have that weight to lift in addition to your own body weight.

- SPREAD THE BASE OF SUPPORT

Widening the base of support in a forward-backward stride position as well as spreading the feet apart gives greater stability to the body segments in the direction the body will be moving.

- HOLD ANY OBJECT YOU LIFT AS CLOSE TO YOUR BODY AS POSSIBLE

Any weight must be held close to your body if it is to be lifted most easily and if body balance is to be maintained. To test this principle, hold your pocketbook at arm's length for a few seconds, then hold it in close to your body. Notice the difference in pull on the muscles. This effect is multiplied when the object to be lifted is heavy. Think of lifting a roast out of the oven. Think, too, of passing a heavy serving dish at the table.

- USE THE STRONG LEG MUSCLES

Following these guides when lifting heavy objects not only helps to keep those three body weights in line but also makes use of the good leverage of the long bones of the legs; moreover, the long, strong muscles of the legs and thighs can do the lifting job more easily than the small muscles of the back.

- **THINK OF WAYS TO AVOID HEAVY LIFTING**

A load of clothes weighs almost twice as much when it comes out of the washing machine as when it goes in. A basket of damp clothes on the floor has to be lifted. If you place the basket on a bench or cart before adding the damp clothes, you have eliminated a bad lifting job. Another great muscle saver is the use of wheels—on your ironing board, your vacuum cleaner, your serving cart, or any other piece of portable equipment. Grocers have been capitalizing on this idea for years.

WORK HEIGHTS WHEN STANDING

Good body alignment is aided or hindered by the heights of surfaces at which you work. If you are well trained, you consciously hold yourself erect while working at sinks, counters, sewing tables, and desks that are too low. You may also wear flat-heeled shoes and spread your feet apart to shorten the distance between your elbows and the work surface. In addition, you can lower yourself to the work by bending at the knees and hips, thus keeping the pelvis, chest, and head in good alignment. But too frequently when you are busy, you may forget to keep those three weights in line. Between the interruptions from the children and concentration on the task at hand, you need to depend on the height of the surface for a reminder. Surfaces at the correct height allow you to work without undue strain or fatigue because body weights remain aligned one over the other, and the task is more easily seen and reached.

Selecting a Particular Work Height

- **BODY PROPORTIONS AND VISION AFFECT CHOICE**

A combination of various body measurements, rather than any one measurement, determines the suitable height for each task. Overall height, length of arm, and body build must be considered; thus, for example, no one work height can be suggested to suit all homemakers who are 5 feet 4 inches tall. Elbow height, which averages 40 inches above the floor, seems to be the most significant body measurement. Vision will also influence your choice of a satisfactory work height, particularly if you wear bifocals or are farsighted.

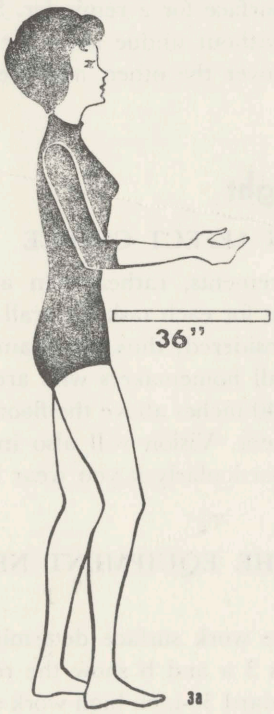
- **THE TASK TO BE DONE AND THE EQUIPMENT NEEDED MUST BE CONSIDERED**

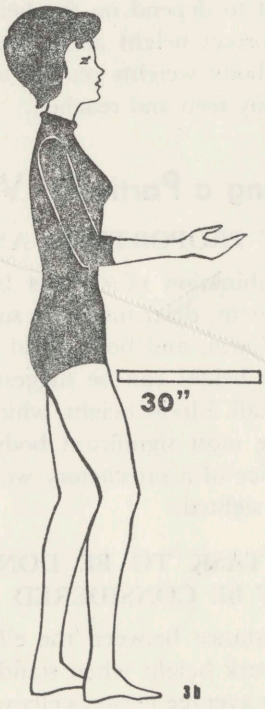
The distance between the elbow and the work surface determines the correct work height when standing. Figures 3 a and b show the relationship of an average person's elbow to the standard 36-inch high work counter

and the standard 30-inch high table or desk. In general, you need about 6 inches between the elbow and work surface for the motions of a task and, at the same time, for being close enough to it to maintain good posture. But work heights differ for ironing, mixing or chopping foods, washing dishes, folding diapers, and removing foods from the oven since different types of motions are involved in each; also, equipment for each task varies in size. For example, in washing dishes you usually work about 1 inch from the bottom of the sink; therefore, a sink installed in a cabinet that is level with the work surface may be too low.

Possible Adjustments

Many of you live in rented homes or in homes that have commercially built cabinets of standard height; yet, obviously, people don't come in a "standard" height. In fact, the standard 36-inch counter suits only a small proportion of homemakers—and then only for certain tasks. Inexpensive adjustments can be made, however. Height can be added to the counter by putting blocks under the cabinet or adding a platform on top. Although counters cannot be lowered easily, you can find a more convenient height elsewhere. The bottom of the sink is one possibility; the kitchen table, a drawer, or a utility cart are others. A little imagination and experimentation can individualize your "standard" work areas.



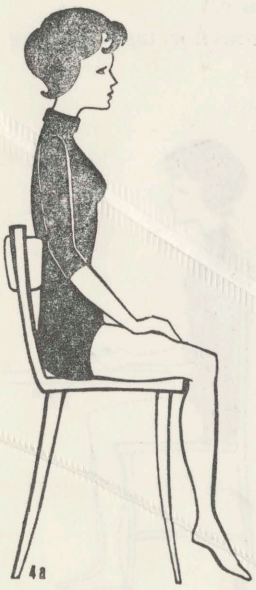


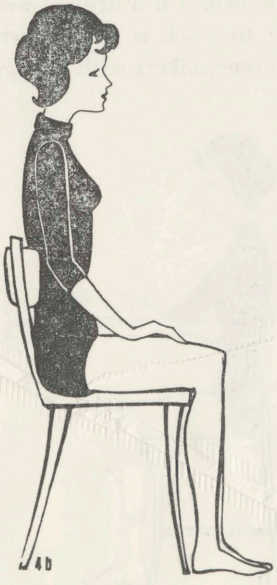
WORK HEIGHTS WHEN SEATED

Balanced alignment is as important in sitting as in standing; the base of support is simply transferred from the floor to the chair seat. The chair must facilitate good posture if it is to be used successfully in sitting to work. In figure 4 a, only the model's toes touch the floor; the chair seat presses her thighs, just above the knees. For a very short period of time, this chair would be acceptable, but it would soon be uncomfortable. In figure 4 b, the chair encourages good posture for the model, and she will be comfortable for long periods of time.

Selecting a Suitable Chair

- The chair should support the upper and lower back with the hips well back on the seat. This is possible only when the depth of the seat and the height of the chair are correct for you.
- The chair seat depth should be such that the legs can bend at the knees and the feet rest flat on the floor. The chair seat should not be so deep as to cause pressure to be exerted on the calves of the legs.
- The height of the chair should be approximately the length of the lower leg so that the feet rest flat on the floor and the feet and knees can be kept together. The chair seat should not be high enough to exert pressure on the thigh just above the knee, or circulation will be reduced.





Selecting a Work Height

After a suitable chair has been selected, a comfortable work height must be determined for performing the given task. The following considerations are important.

- The distance between the elbow and work surface affects the ease of working for sitting as well as standing.

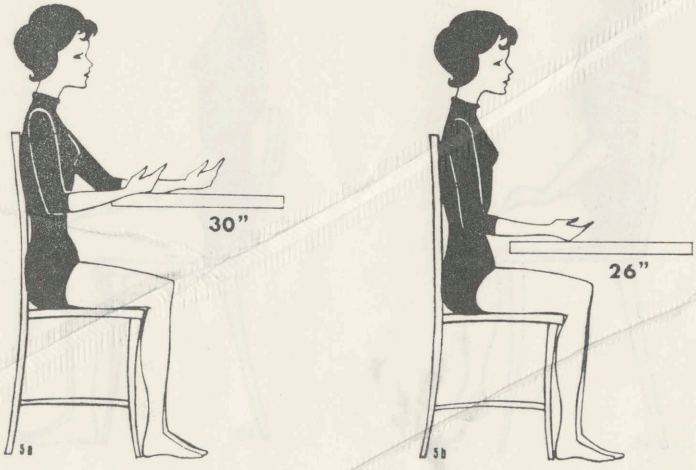
When you sit to work, the basic position of the upper arm is close to the body and the lower arm is parallel to the floor or at a right angle to the upper arm. You have more strength in your arms when they are in such a position than when they are bent sharply.

In figures 5 a and b, the model, average in size and body proportions, is seated at 30-inch and 26-inch tables. Desks and tables are commonly 30 inches in height, but the 26-inch table is more suitable for this model. Notice that at the 30-inch table many of you would have to work either with the arm bent in an acute angle or extended across the table. Neither of these positions would be comfortable for any length of time, nor could you exert the amount of pressure needed for chopping or for other similar activities.

- The "sit-to-work margin" is only 3 inches for the average person.

This is the distance between the top of the thighs and the elbow and lower arm when the arm is bent in a working position. At the lower table in figure 5b, the work area is just below elbow height but still allows room for the knees underneath. Notice the small space between the model's thighs and the table. Can you see why you would have difficulty finding a suitable height if a drawer were in this space?

Sitting to work is particularly advantageous for tasks of long duration and for homemakers with leg problems.



- Your benefits from sitting to work are greater for tasks that are long, especially if you have a physical problem to consider.

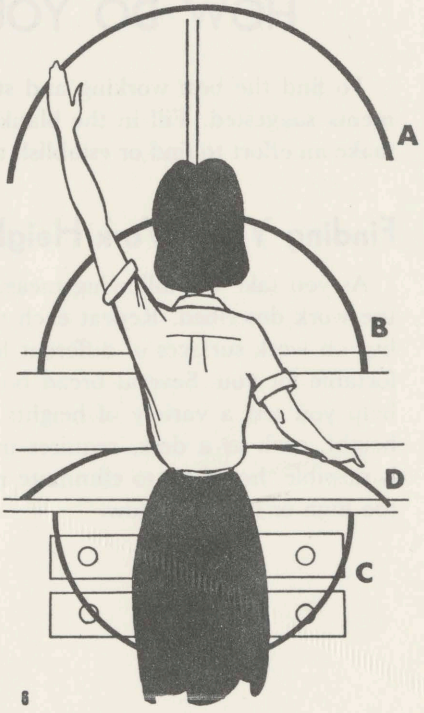
Possible Adjustments

Since most desks and tables are the standard 30-inch height, you must use your imagination to set up a suitable work area. You may decide to use cushions on the seat of the chair and a platform on which to rest your feet. Another suggestion, particularly for tasks of short duration, is the perch stool which allows you to take the weight off your feet and yet to get up and down easily. Adjustable ironing boards make good work areas for a variety of tasks other than ironing. A fourth possibility, of course, is to have a custom-built work surface of a good height for you. There are countless adjustments that you can make so that all members of your family can have comfortable work heights. Use your creative imagination.

STORAGE HEIGHTS

Another important consideration in planning work areas is the height of storage units. Straining to reach articles stored on high or low shelves is tiring and can disrupt the flow of work, particularly if it must be done frequently or if the articles stored are heavy.

Figure 6 shows the arcs you must consider in selecting storage for frequently used items. Arc A shows your easy upward reach from the shoulder as you stand at your kitchen counter. The top of that arc indicates the upper limit for your top shelf of active storage.



Arc B is also above the counter but inside the first arc and is made by holding your upper arm comfortably close to your side and swinging the lower arm from the elbow rather than from the shoulder. This is your elbow reach upward and encloses the space best suited for storing the things you use most frequently, for heavy utensils such as an electric mixer, and for large dinner plates.

The lowest arc, C, is also a shoulder swing with the fingers slightly curved and moving from the side to center front. The area thus enclosed marks the location best suited for frequently used lower drawers. Notice that almost the entire base cabinet in figure 6 is located outside this model's area of comfortable reach. Drawers and pull-out shelves help to bring this out-of-reach space into greater usefulness.

Arc D is drawn on the work surface with the upper arm comfortably close to the body and swinging from the shoulder. It is drawn from directly in front of you to the front edge of the work surface and encloses the space within which you could work with the very least effort. This semicircle might very well hold your writing materials on your desk. Extra books and supplies should be placed outside the active working area. At the mix center, your bowls and tools could well be placed within the active area.

The total area enclosed in these four arcs is the most convenient work and storage space from the point where you are standing. Check the location of equipment and utensils in your cupboards to see that you are storing the most frequently used items within easy reach. In the area outside these arcs, store items which are seldom used.

HOW DO YOU "MEASURE UP"?

To find the best working and storage heights for *you*, take the measurements suggested. Fill in the blanks with the appropriate figures and then make an effort to find or establish these heights within your own home.

Finding Your Work Heights

As you take the following measurements, don't just pretend to be doing the work described. Repeat each task using the actual materials called for but on work surfaces of different heights until you find the one most comfortable for you. Several bread boards or an adjustable ironing board will help you test a variety of heights. Often determining a comfortable work height, such as a desk, requires much longer than a brief trial period. It is possible, however, to eliminate rather quickly the heights that are much too high or much too low.

Task	*Inches from floor to comfortable work surface*
Beating by hand or chopping	.....
Stirring food in saucepan, on front burner	.....
on back burner	.....
Ironing clothes, standing	.....
seated	.....
Machine sewing	.....
Writing letters	.....

Drawing Your Work and Storage Arcs

As you draw each of the following arcs, wear shoes with heels the height you normally wear while working at home.

Arc	*Inches from floor to top of arc*
A. Draw this arc by extending your arm upward from the shoulder with fingers curved as though grasping a stick. (This is the best location for the top shelf.)	.....
B. Swing forearm upward from the elbow with upper arm comfortably close to your side. (This encloses the space suited for storing heavy and frequently used articles.)	.....

	Inches from floor to bottom of arc
C. Swing arm as it hangs easily from the shoulder, and curve your fingers. (This is the best location for frequently used lower drawers.)	.....

	Inches from counter front to back of arc
D. Work surface arc: With upper arm comfortably close to your body, swing forearm horizontally over the work surface. (This is the best counter space for working with least effort.)	.....

Cooperative Extension Service of South Dakota State University and U. S. Department of Agriculture

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the United States Department of Agriculture. John T. Stone, Dean of Extension, South Dakota State University, Brookings.

Reprinted with permission of the New York State College of Home Economics, a Statutory College of the State University, at Cornell University, Ithaca, New York, from Cornell Extension Bulletin 1139 by Katherine H. Sippola.

1M—10-68—File 11-2—8363