

5. ● What is the definition of posture and why is it important?

Posture means position. Holding the body statically in a position places stresses on the tissues of the body.

- The key difference between good and bad posture is simply the stresses on the body. If a particular position (i.e., posture) of the body places what we would consider excessive physical stress on the tissues of the body, we call it bad posture.

6. ● Stress is caused by stressors. A stressor is anything that requires the body to change.

- Stressors may be physical or psychological/emotional. They are viewed by the body as alarming and are generally handled by the sympathetic branch of the autonomic nervous system.

- Can stress be avoided altogether?

No. Living involves change and growth; therefore all stress cannot be avoided. Stress cannot be avoided altogether; but excessive stress should be avoided.

7. ● Standing posture is usually analyzed by comparing the symmetry of the body against a vertical line that is created by a plumb line.

- With ideal posture from the posterior view, the plumb line should bisect the body into equal right and left halves.

- What does this type of assessment look for?

This type of assessment is useful for assessing right and left symmetry and balance, even division and equal position between the left and right halves, equal shoulder and iliac crest heights, straight knee joints, and the degree of foot pronation/supination. These are in the frontal plane.

8. ● With ideal posture from the lateral view, the plumb line should descend through the ear (i.e., external auditory meatus), acromion process of the scapula, greater trochanter of the femur, knee joint, and the lateral malleolus of the fibula.

- What does this type of assessment look for?

It looks for postural distortions in the sagittal plane by looking at anterior and posterior symmetry and balance, excessively flexed or extended joints, head balanced over trunk, trunk balanced over pelvis, excessive anterior or posterior tilt, hyperextended knee or hip joints, and increased or decreased spinal curves.

- 9● Standing plumb line posture is only one piece of a postural assessment and is even a smaller piece of the overall assessment of the client's health. Remember that function of the body is more important than structure, even though there is a strong link between the two.

- Frontal and sagittal plane assessment should be factored in with other findings about the client's health. Furthermore, rotational distortions within the transverse plane should not be overlooked as a piece of the clinical puzzle.

- The best view from which to see a transverse plane postural distortion is from above.

13. . ● Postural distortions exist when the body is not posturally symmetric and balanced.
- Any deviation from ideal posture in the posterior view means that the client has a postural distortion within the frontal plane.
 - In this illustration the person's right shoulder girdle is higher than the left. Long-term carrying of a purse or shoulder bag on the right side has led to chronic hypertonicity of her right-sided scapular elevator musculature. This musculature has tightened to elevate the right shoulder girdle so that the purse does not fall off; it has now become a chronic postural pattern.
14. ● Any deviation from ideal posture in the lateral view means that the client has a postural distortion within the sagittal plane.
- Figure 18-3 shows a person with a sagittal plane postural distortion. The result of holding her head anteriorly is that the center of weight of the head is no longer balanced over the trunk. Long-term reading with a book down in her lap has led to chronic hypertonicity of her posterior extensor head/neck musculature. This musculature has tightened to prevent the head and neck from falling forward into flexion; it has now become a chronic postural pattern. The "X" indicates the center of weight of the head.
15. ● What two things should be determined when analyzing posture?
- It is important to determine what stressful effects the client's postural distortion will place on the tissues of the body. The cause of the postural distortion should also be determined.*
- The center of weight of an object is an imaginary point where all the weight of an object could be considered to be located. If the center of weight of an object is over the object below, then the upper object is not balanced and would fall unless some force holds it there. This concept applies to the major parts of the human body.
16. ● What is the relationship between a primary postural distortion and a secondary postural distortion?
- A primary postural distortion is due to a problem in that area of the body. A secondary postural distortion is due to a problem in another area of the body. It occurs secondary to the primary problem.*
- A postural distortion pattern is a set of interrelated postural distortions located in the body, including both the primary postural distortion and the secondary postural distortion(s).
17. ● In this illustration, the high right shoulder is due to the person's collapsed left arch, which has dropped the entire left side of the client's body. Therefore it is a consequential secondary postural distortion and is not due to a local problem of the right shoulder girdle region.
18. ● Compensatory secondary postural distortions are created by the body as a compensation mechanism for another primary postural distortion.
- In this illustration the primary postural distortion is a collapsed left arch. In this person's case, the spine has developed a scoliotic curve to compensate for the low

left side which has dropped due to the collapsed arch. The shoulder heights have been brought level by the curving of the spine. This scoliosis is an example of a compensatory secondary postural distortion.

19. ● When a body part deviates to one side, the body part above it will usually deviate to the opposite side to counterbalance the weight of the body.
 - When a joint of the body becomes hypomobile, other joints often compensate by becoming hypermobile.
 - Opposing muscles on opposite sides of a joint usually need to balance their pull on the bone to which they attach. If a muscle on one side of a joint becomes tighter and therefore shortens, the opposing muscle will often become tighter in an attempt to even out the pulling force on their common attachment.
21. ● In this lesson, we will examine the following common postural distortion patterns: protracted head, rounded shoulders, rounded back, and swayback. The other patterns will be discussed in the next lesson.
22. ● Protracted head commonly occurs as a result of what?

It occurs as a result of a multitude of postures that require the head/neck to flex forward to see and work with something that is down and in front of the body.

 - Because the center of weight is over thin air, the head and neck fall into flexion unless the posterior neck musculature isometrically contracts. This creates a force of extension that stops the head from falling into flexion, but creates increased stress on these muscles which can lead to tightness and tension headaches.
23. ● Rounded shoulders often accompany a protracted head posture and result from activities in which a person works in front of the body, but instead of holding the scapulae back into retraction, the shoulder girdles fall into protraction.
 - What is another name for an increased thoracic spinal curve?

It is hyperkyphosis.
24. ● The presence of a hyperkyphotic thoracic spinal curve, or rounded back, predisposes a person to having what other postural distortions?

It predisposes the person to having rounded shoulders and a hypolordotic lower cervical spine with a hyperlordotic upper cervical spine.
25. ● Swayback, or hyperlordotic lumbar spine, is often the consequence of an anteriorly tilted pelvis, which in turn is often the consequence of an imbalance of anterior/posterior tilt muscles of the pelvis.
 - Swayback often leads to what other postural distortions?

It often leads to increased thoracic kyphosis, rounded shoulders, and a protracted head posture.
26. ● This illustration shows a body-wide sagittal plane postural distortion pattern. When this person's body weight is thrown anteriorly due to wearing high-heeled shoes, she compensates for it by increasing the curve in the lumbar spine (swayback). As a result of this increased curve in the lumbar spine, her thoracic spinal curve increases as well (rounded back). This then tends to slump her

shoulders forward (i.e., rounded shoulders) and throws her neck and head anteriorly (i.e., anteriorly held head).

28. ● High-heeled shoes are perhaps one of the worst offenders to posture. They begin their effects at the very foundation of the body; the sequelae then occur all the way up the body causing many sagittal plane distortions.

29. ● As noted in Lesson 18.3, the woman in this illustration shows several postural distortion patterns. In this case, they all began with what she is wearing on her feet: high-heeled shoes

30. ● This lesson finishes out the list of common postural distortion patterns including elevated shoulder, scoliosis, and dropped arch.

31. ● What are some of the most common causes of elevated shoulder as a primary postural distortion?

Carrying a bag or purse on the shoulder, crimping a phone between the shoulder and head, and improper desk height that requires the shoulders to be raised when working and typing are common causes of tight musculature in the shoulder girdle area.

● The muscles of the shoulder girdle region may not be tight if the elevated shoulder is a secondary postural distortion. However, adaptive shortening may occur if the condition persists.

32. ● Scoliosis involves structural changes to the shape of the spine. The functioning of the spine will be affected and motion will decrease if this structural distortion is in existence for a number of years.

● What is the name of the primary scoliosis that usually strikes teenage girls?

It is called idiopathic scoliosis and can be very severe.

● If a scoliosis is secondary to another problem, then the primary cause must be addressed or the scoliosis will continue.

33. ● Dropped arch is also known by what other name?

It is also known as flatfoot.

● Whether a person has a rigid or supple flatfoot, when a foot does not have its arch, certain musculoskeletal consequences occur.

● If only one foot drops an arch, it causes a drop in height on that side's lower extremity, which causes a dropped pelvis. If the spine does not compensate for the dropped pelvis, it will cause a low shoulder girdle on that side. If it does compensate, the person will have a scoliosis.

34. ● Figure 18-7a shows how clearly the asymmetry of the posture of the upper trunk can be seen on this person with a mild/moderate scoliosis.

● Figure 18-7b shows the more common view that we have when trying to assess transverse plane postural distortions. This perspective is not as ideal, but subtle clues are present such as the orientation of the trunk (not facing perfectly anterior), and the asymmetry of the arms by the sides of the body.

35. ● Using a plumb line can be helpful when assessing posture, but it does have limitations.
- A plumb line cannot be used to analyze rotational distortions in the transverse plane, because the transverse plane is horizontal.
 - Plumb line posture is only used in assessing standing posture. Many clients, however, spend the majority of their time in another posture.
 - Static postural analysis is only one piece of assessing a client's health. Dynamic posture, or acture, which is the fluidity of movement patterns, may be of much greater importance.
37. ● The gait cycle is defined as the cyclic pattern of engagement of muscles and joints of the body when walking.
- As seen in this illustration, the gait cycle begins with one heel-strike and ends with the same side heel-strike. One gait cycle is comprised of one stride, which in turn is composed of two steps.
38. ● Heel-strike is the landmark that begins stance phase (and ends swing phase). Foot-flat is the moment that the entire plantar surface of the foot comes into contact with the ground. Midstance is the midpoint of stance phase and occurs when the weight of the body is directly over the lower extremity. Heel-off is defined as the moment that the heel leaves the ground. Toe-off is defined as the moment that a person's toes push off and leave the ground. Toe-off is the landmark that ends stance phase (and begins swing phase).
- Swing phase is divided into three equal sections and accounts for 40% of the gait cycle.
39. ● The stance phase is defined as when the foot is on the ground and accounts for 60% of the gait cycle for each foot; the swing phase is defined as when the foot is swinging in the air.
- What is the period of double-limb support?
The period of double-limb support is when both feet are in contact with the ground. Walking is defined by the presence of double-limb support.
 - The major landmarks of stance phase and swing phase are illustrated here in Figure 17-10.
40. ● Why must the foot be supple and flexible during the early stages of the stance cycle?
It must be supple and flexible to adapt to the uneven surfaces of the ground.
- The foot must be stiff and stable to propel the body forward during toeing-off. Supination holds the arches high and creates a more rigid, stable foot for propulsion.
 - The ability of the plantar fascia to change from being lax to taut is created by the windlass mechanism.
41. ● There are three major roles of the musculature of the lower extremity during the gait cycle. What are they?

*Muscles may contract concentrically to create movement of the lower extremity.
Muscles may contract eccentrically to slow down a movement of the lower extremity.
Muscles may contract isometrically to stabilize a body part.*

- Improper mechanics during the gait cycle often lead to functional problems throughout the body.
 - Figure 18-10 shows the intensity of the contractions of the major muscles of the lower extremity correlated with the phases and landmarks of the gait cycle.
42. ● The hip joint flexors contract concentrically to create the forward swing of the lower extremity during the early aspect of the swing phase and contract eccentrically to decelerate the extension of the thigh just before toe-off during the stance phase.
- Hip joint extensors contract eccentrically to decelerate the forward-swinging limb at the late aspect of the swing phase and contract isometrically on heel-strike of the stance phase to stabilize the pelvis.
 - The hip joint abductors contract, creating a force of depression on the same side of the pelvis during the stance phase of gait.
43. ● The hip joint adductors contract at heel-strike to aid the hip joint extensors' stabilization of the hip joint. They contract again just after toe-off to aid in flexion of the thigh at the hip joint.
- The medial rotator muscles are active during the stance phase of gait performing their reverse action of ipsilateral rotation of the pelvis at the hip joint.
 - The hip joint lateral rotators are primarily active during the stance phase of gait. They control the hip joint medial rotator's action on the pelvis.
44. ● The reverse action of the lateral rotator muscles of the hip joint is contralateral rotation of the pelvis at the hip joint.
- Contralateral rotation of the pelvis is extremely important when planting and cutting in sports.
 - What is planting and cutting?
Planting and cutting is done when a person plants a foot on the ground and then changes the direction that he/she is running by turning the body to orient to the opposite side.
45. ● What roles do the knee joint extensor muscles have during the gait cycle?
They contract concentrically at the end of the swing phase to extend the leg at the knee joint and reach out with the leg in preparation for heel-strike. Knee-joint extensors also contract during stance phase to decelerate the knee joint flexion and create extension of the knee joint.
- Knee joint flexors contract eccentrically to decelerate knee joint extension just before heel-strike, contract just after heel-strike to stabilize the knee, and contract during the swing phase to keep the foot from dragging on the ground.
46. ● The ankle joint dorsiflexors eccentrically contract to decelerate plantarflexion of the foot at the ankle joint at the beginning of the stance phase. They also contract concentrically during the swing phase of the gait cycle to create dorsiflexion of the

foot at the ankle joint to keep the toes from scraping the ground as the swing limb is brought forward.

- Ankle joint plantarflexors eccentrically contract during most of the stance phase to decelerate dorsiflexion of the foot at the ankle joint. They also contract more forcefully in a concentric manner at heel-off during the late stage of the stance phase to help push the foot off the floor.
47. ● Subtalar joint supinators contract eccentrically during the stance phase to decelerate pronation of the foot at the subtalar joint. They also concentrically contract between foot-flat and toe-off to supinate the foot at the subtalar joint.
- Subtalar joint pronators are active during the later stance phase of the gait cycle. What do they do?

Subtalar joint pronators contract along with the subtalar joint supinators to help stabilize the foot and make it more rigid as it readies to push off the ground for propulsion.