PART I

Getting Started With Postural Assessment

Do you have questions concerning the assessment of posture? The two chapters in part I set the scene for postural assessment. Chapter 1 addresses questions such as these: What is posture? What factors affect it? We examine the controversial question of whether there is an ideal posture before exploring who should have a postural assessment, when, where and why. The information in chapter 2 will help you to prepare for your first assessment. You will learn how long the assessment might take, what equipment you might use, key points regarding standard, or ideal, postural alignments, plus tips on documenting your findings. Both chapters conclude with Quick Questions, which you can use to test your understanding of the topics covered.

1

Introduction to Postural Assessment

Welcome to *Postural Assessment*. Let's start by addressing some common questions concerning this fascinating subject. For example, what do we mean by the term *posture,* and why should you do a postural assessment? For which clients might postural assessment be helpful? When and where should the assessment be done? Do you need any equipment? This chapter answers these questions and examines factors affecting posture. You might wish to glance at the five Quick Questions at the end of this chapter before you begin, because doing so may help you retain some of the information if you are new to this subject.

What Is Posture?

Ask anyone to demonstrate poor posture, and it's a fair bet that most will adopt a slouched or hunched position, protracting their shoulders and rounding their backs to exaggerate the kyphotic curve in the thoracic spine. Ask for a demonstration of good posture, and most people automatically straighten up, raise their chins, and retract and depress their shoulders in a military-type attitude. Clearly, for most people, the term *posture* describes an overall body position, the way we hold ourselves or position our bodies, intentionally or unintentionally. Used in an artistic context, it might describe a pose, or a position held deliberately for aesthetic effect.

Good posture requires a person to maintain the alignment of certain body parts; poor posture is often acknowledged as a cause of musculoskeletal pain, joint restriction or general discomfort. When used in the context of therapy—physiotherapy, massage therapy, osteopathy or chiropractic, for example—the term *posture* more precisely describes the relationships among various parts of the body, their anatomical arrangement and how well they do or do not fit together. Bodyworkers have become familiar with postural terms such as *scoliosis* and *genu valgum*, which are used to describe a congenital,

Assessing Posture

Here are three people. One has had chest surgery, one has hypermobile joints and one has very tight external hip rotators. Can you tell which is which by looking at these photographs?

a

b

c

a. hypermobile joints; b. chest surgery; c. tight external hip rotators

inherited position, plus used to describe a position assumed through habit, such as increased thoracic kyphosis resulting from prolonged sitting in a hunched position.

Of course, the postures we assume provide clues to not only the condition of our bodies—traumas and injuries old and new, and mild or more serious pathologies—but also how we feel about ourselves—our confidence (or lack of it), how much energy we have (or are lacking), how enthusiastic (or unenthusiastic) we feel, or whether we feel certain and relaxed (or anxious and tense). Intriguingly, we all almost always adopt the same postures in response to the same emotions.

Observe 10 people feeling confident, motivated, and optimistic, and you will notice that most are standing tall, with their chests out and heads up, and that most have adopted a wide stance, giving themselves a wide base of support. They may be smiling or have a countenance that reflects their positive feelings. By contrast, observe 10 people feeling anxious, demotivated and pessimistic, and you may notice that they have shifted their weight to one leg, reducing their base of support (making them less stable), and that they stoop or flex at the waist, looking to the floor rather than up and ahead. They may touch the chin with one hand the way we sometimes do when we are thinking, and may even cross one or both arms against the chest in a protective manner.

If you are a teacher, you can demonstrate emotional postures to your class. Select one negative emotion and one positive emotion. Ask your class to act as if they were feeling extremely worried (or fearful or anxious or angry). It is important that all class members act out the same emotion. Observe what they do and what postures they adopt for a minute or so. Next, ask them to act as if they had just received a piece of fantastically good news. Again, observe what happens. Be sure to select the positive emotion as the second scenario to avoid students' retaining any sense of negative emotion. Also, suggesting that students carry out this exercise with their eyes closed prevents them copying one another. It is striking to observe how the majority of people adopt the same postures in response to the same emotions.

Although this book focuses on helping you to analyse the physical aspects of clients' postures, it is worth remembering that the postures we adopt reveal more than just the simple alignment of body parts. Our supposedly non-tangible, emotional states are inherently linked to our tangible, physical forms.

What Factors Affect Posture?

It is useful to consider the factors that affect posture to identify which ones you might be able to modify as a therapist and which might be better addressed by the client. There may be some factors affecting posture about which neither you nor the client can do anything at all. Table 1.1 provides examples of factors that affect posture. Perhaps you can think of additional items?

Is There an Ideal Posture?

You need only spend a short time comparing cadaveric specimens to discover that, anatomically speaking, we are not all the same. We may all have two scapulae, but the coracoid process projects at different angles, and the acromion process is similarly varied. The spinous processes of vertebrae are not all angled to the same degree, and some of us have one (or more) limb bones longer than the other, or feet or hands considered disproportionately large to the rest of our bodies, not to mention the variation in soft tissues. It is therefore not surprising that the physiological compensations needed to keep us in the upright position vary. So in answer to the question, 'Is there an ideal posture?' we can say, yes, there is an ideal, but with the caveat that it is not ideal for us all.

Traditionally, students of physiotherapy, osteopathy, and chiropractic have learned to assess posture by comparing the posture of their patients against images of an upright skeleton (see figure 1.1). Observations are made posteriorly, laterally and anteriorly to see how well the bits of a patient fit together compared to how the bits of the androgynous skeletal images fit together. Not surprisingly, the postures of many of us are observed to vary from those represented by the skeletal images.

An excellent early reference for the assessment of posture was *Posture and Pain* (Kendall, Kendall, and Boynton 1952), in which the ideal posture was referred to as 'standard posture'. The authors were quick to point out that such a posture should form the basis for comparison and was not an average posture. For the purpose of

Table 1.1 Factors Affecting Posture

Factor	Examples
Structural or anatomical	■ Scoliosis in all or part of the spine ■ Discrepancy in the length of the long bones in the upper or lower limbs ■ Extra ribs ■ Extra vertebrae ■ Increased elastin in tissues (decreasing the rigidity of ligaments)
Age	Posture changes considerably as we grow into our adult forms, with postures in children being markedly different at different ages.
Physiological	■ Posture changes temporarily in a minor way when we feel alert and energised compared to when we feel subdued and tired. ■ Pain or discomfort may affect posture as we adopt positions to minimise discomfort. This may be temporary or could result in long-term postural change if the position is maintained. ■ Physiological changes that accompany pregnancy are temporary (e.g., low backache before or after childbirth), but sometimes result in more permanent, compensatory postural change.
Pathological	■ Illness and disease affect our postures especially when bones and joints are involved. Osteomalacia may show up as genu varum; arthritic changes are often revealed when joints in the limbs are observed. ■ Pain can lead to altered postures as we attempt to minimise discomfort (e.g., following a whiplash injury a client may hunch the shoulders protectively; abdominal pain may lead to spinal flexion). ■ Mal-alignment in the healing of fractures may sometimes be observed as a change in bone contour. ■ Certain conditions may lead to an increase or a decrease in muscle tone. For example, someone who has suffered a stroke may have increased tone in some limbs but decreased tone in others. ■ As elderly adults, we tend to lose height as a result of osteoporotic changes and so develop stooped postures; postmenopausal women may develop a dowager's hump.
Occupational	Consider the postural differences between a manual worker and an office worker, and between someone active and someone sedentary.
Recreational	Consider the postural differences between someone who plays regular racket sports and someone who is a committed cyclist.
Environmental	When people feel cold they adopt a different posture to that when they feel warm.
Social and cultural	People who grow up sitting cross-legged or squatting develop postures that are different from those of people who grow up sitting on chairs.
Emotional	■ Usually, the posture we subconsciously adopt to match certain moods is temporary, but in some cases it persists if the emotional state is habitual. Consider the posture of a person who is grieving, or the muscle tone of a person who is angry. ■ Clients who fear pain may adopt protective postures.

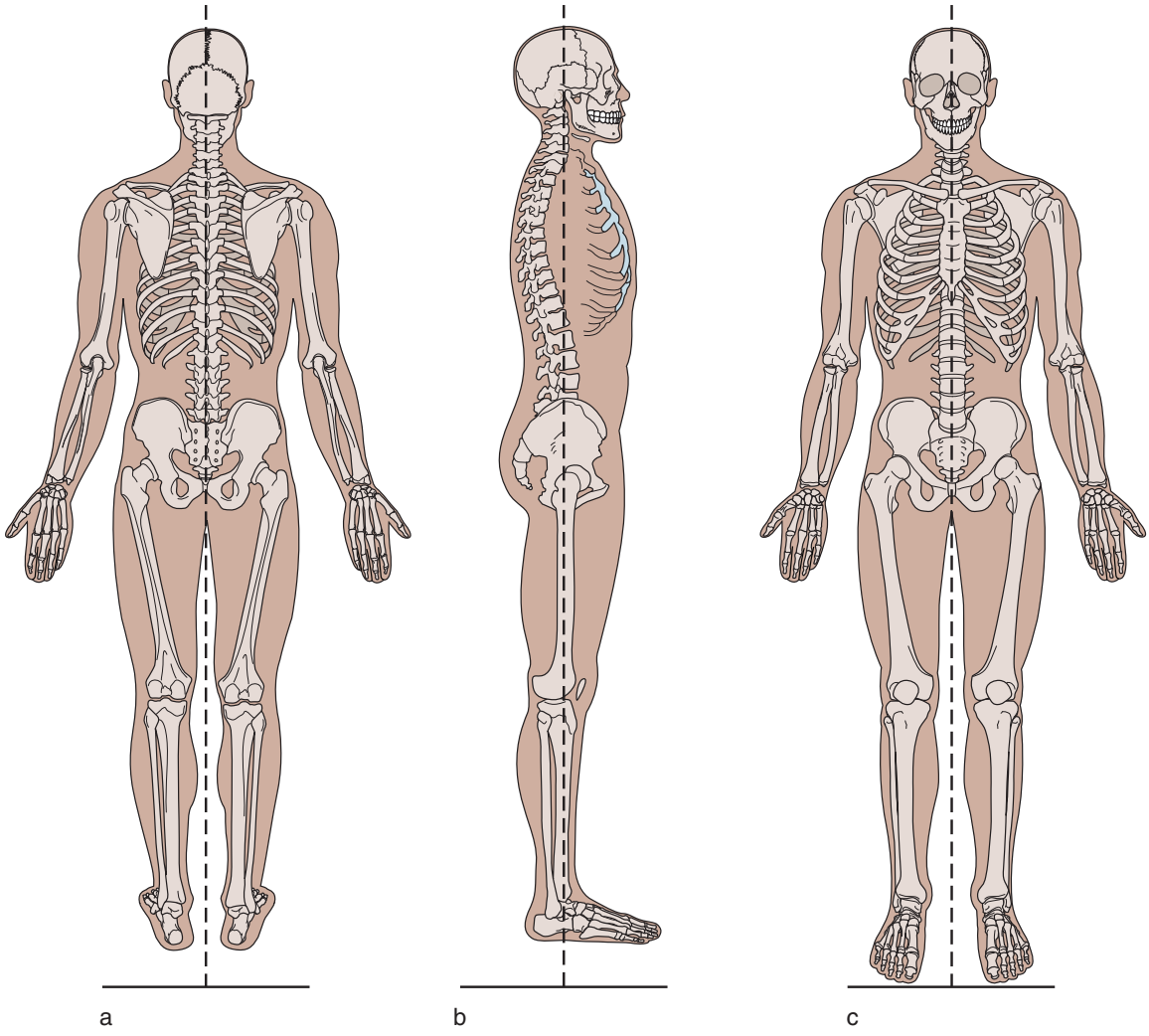


Figure 1.1 Traditional images of the ideal posture: *(a)* posterior, *(b)* lateral and *(c)* anterior.

understanding posture, using such images is as good a place to start as any. One of the disadvantages to this approach is that it may lead to a compartmentalisation of the body: a therapist might observe a client's neck to be excessively lordotic compared to the ideal posture, for example, and conclude that the problem is in the neck. Yet we need to take a broad view of clients and their bodies to identify the factors causing or contributing to their problems, because where a client experiences pain, discomfort or restriction in movement is not necessarily the source of the problem. By focusing too much on how local structures fit together, we risk overlooking what keeps them together. We tend to become focused on the part rather than the whole.

Let's say you have noted that a client has an excessively lordotic neck, with no history of disease or trauma. The posterior muscles may be shortened and tight, whereas

the anterior muscles are lengthened and weak. So you surmise that stretching out the cervical extensors will improve the client's head position. Yet for many clients, the problem in the neck is likely to persist if postural imbalances in other areas of the body are not also addressed. An excessive lordosis in the cervical region of the spine often accompanies an increased kyphosis in the thoracic region. If the kyphosis remains unaddressed, the increased cervical lordosis is likely to persist despite treatments aimed at correcting it. This is because to compensate for a kyphotic spine, we must alter the position of the head (and ultimately the cervical spine); otherwise, we end up with our eyes facing the floor.

It is not just the positioning of body parts or the alignment of bones that we need to consider when examining posture. In recent years much has happened to improve our understanding of fascia and how it connects one part of the body to another. Advocates of techniques such as myofascial release argue that imbalances at one end of the body can affect structures at the other end because restrictions in fascia cannot be viewed as solely localised phenomena. For those interested in the importance of fascia to postural assessment and correction, I recommend *Fascial Release for Structural Balance* (Earls and Myers 2010) and *The Nature of Fascia* (Schleip 2008).

There is no doubt that an appreciation of the role of fascia in postural assessment will make you a better assessor. Yet because fascia embraces us entirely, linking all parts, there is no beginning and no end for the observer. I therefore hope that those of you already skilled at taking into account fascial tension in various parts of the body when you perform your postural assessments will forgive me for reverting to the more traditional compartmentalised approach. We do, after all, have to start somewhere.

Why Should I Do a Postural Assessment?

One of the first questions you might ask when considering postural assessment is why you would want to do it in the first place. What's the rationale behind such an assessment? The main reasons for carrying out a postural assessment are to acquire information, save time, establish a baseline, and treat holistically. Let's take each of these points in turn.

Acquire Information

First, and most important, performing a postural assessment gives you more information about your client. Here are three examples to illustrate this point:

- **Example 1.** Working with the general population, you have your fair share of clients suffering from back and neck pain. Many clients believe that their 'terrible posture' is due to the sedentary nature of their work, the long hours they spend slumped at a desk or driving. It would be helpful to know whether a client's pain does indeed stem from the adoption of habitual postures, or whether it might be due to something else. By distinguishing among various causes, you are more likely to be able to determine whether a change in working posture might be beneficial.
- **Example 2:** You are treating clients who regularly engage in sport or physical activity. A 30-year-old man comes to you complaining of recurring knee pain. He is a keen runner. Could his pain be aggravated by the posture of his lower limbs? Could

he be flat-footed, have genu valgum or a leg length discrepancy, factors postulated to contribute to knee pain in runners? You observe your client, and his posture seems fine. Is it then more likely that his knee pain is the result of the quality or quantity of his training? Sometimes doing a postural assessment helps you rule *out* anatomical causes.

- **Example 3:** Assessing a 49-year-old woman for worsening shoulder pain, you notice a decrease in shoulder muscle bulk during the postural assessment. One possible explanation for atrophy of the shoulder muscles (accompanied by a progressive decrease in range of movement) in a client with no history of trauma is adhesive capsulitis. The information you have gained from your observation has contributed to the formulation of your diagnosis, which may later be substantiated or refuted with the appropriate tests. It is important to remember that postural assessment is only one component of the assessment procedure, and that to make a diagnosis of any condition, all components of the assessment procedure need to be considered, along with current guidelines. For example, to support a diagnosis of adhesive capsulitis, you may follow guidelines such as those set out by Hanchard and colleagues (2011).

The postural assessment is also an opportunity to clarify observations about marks on the skin such as scars. Experienced clinicians know that clients sometimes forget to mention significant operations (such as appendectomies), being so used to the scar and having forgotten about the operation. Adults who received treatment for fractures in childhood may fail to mention this, either because they have forgotten about the incident or because they are not sure of its relevance to the problem they now have. Noticing old scars and mentioning them is a good way to get extra information that in some cases proves relevant.

Save Time

A second reason for carrying out a postural assessment is that in the long run it saves time. It may reveal facts that are pertinent to the client's problem that might otherwise have taken longer to establish. The relationships among body parts are more difficult to assess when someone is lying down to receive a treatment, but suddenly become obvious when they stand. Here are two examples:

- **Example 1:** You are a sports massage therapist treating a typist who is normally fit and healthy. She is complaining of right-side anterior shoulder pain. Performing both the standing and sitting postural assessments, you observe that your client has a considerably protracted right scapula, something you had not noticed when your client was the prone position, a position in which both scapulae naturally protract.
- **Example 2:** Your client is an elderly man with pain in his left ankle. Observing his posture from the posterior and anterior views, you get the impression that he does not bear weight equally through his lower limbs but seems to favour his left leg despite this being the problem ankle. There is slightly more bulk in the left calf muscle, too. Upon questioning, the client recalls fracturing his right ankle as a child and admits to feeling fearful about bearing weight through this ankle. Even though the client knows the fracture is fully healed, he reports always having relied more on his left leg for support. Could this information explain the pain in the client's *left* ankle? Could he have

an arthritic ankle, or could the pain simply be due to the accruement of stresses in the joint from increased weight bearing? The subtle increase in muscle bulk you observe on the left calf in standing is something that you may not have spotted when the client was in the prone position or when performing range of movement tests. Observing the alteration in weight bearing has provided you with a significant piece of information.

Establish a Baseline

A third reason for performing a postural assessment is that it helps you to establish a baseline—a marker by which you might judge the effectiveness of your treatment. If your client has muscular pain in the low back resulting from the position of the pelvis, and you prescribe exercises and stretches to correct this posture, you will no doubt need to reassess the client at some stage to determine whether there has been any change in the pain and whether this can be attributed to an alteration in the position of the pelvis. Many therapists use subjective feedback from the client as a benchmark measure of effectiveness. If we suspect that a problem *is* the result of poor posture, we need to identify whether we have made any impact (directly with massage and movement, or indirectly with prescribed exercises and stretches) on the client's upper body posture. The way to do this is to assess posture before and after the treatment intervention. For more information on this subject, see the section When Should Postural Assessment Be Done? on page 13.

Treat Holistically

Finally, it could be argued that by including an analysis of posture as part of our assessment, we are offering a more complete service, in keeping with the idea of treating people holistically, not compartmentalising them as a bad knee, a frozen shoulder, or whiplash. We keep records of clients' states of health and physical activities, so it seems logical that we also keep a record of their postures.

Now that you are aware of the many good reasons for carrying out a postural assessment, we need to identify those clients for whom a postural assessment would be most beneficial.

Who Should Have a Postural Assessment?

This book is aimed at those of you working with the general population—whether fit and active or unfit and sedentary—rather than with clients who may be hospital based and suffering from sudden trauma or long-term illness. Ideally, you should perform a postural assessment on all clients presenting for sports or remedial massage, physiotherapy or osteopathy treatments. If you are working as a fitness professional—one of your aims being to strengthen weak muscles—or as a teacher of yoga—aiming perhaps to lengthen muscles—you too will find postural assessment beneficial because it will help you identify muscle imbalances and you can therefore design the most effective exercises and postures for your clients. However, with some clients, a postural assessment may not be appropriate, such as the following:

- An anxious client
- A client unable to stand because of pain or illness
- A client who is unstable when standing or when getting to or from the standing position
- A client who does not understand the purpose of the assessment or who does not give consent to having one performed
- A client with a condition that would benefit from a different form of assessment

When working with an anxious client, you may want to postpone a postural assessment while you develop a rapport. Once that is established, you can carry out a more thorough assessment, including that of posture. It would be inappropriate to assess the posture of a client who is unable to stand because of pain or illness. Remember, you can still assess a client in a seated position (see chapter 6, page 125). In some cases a postural assessment is warranted but must be performed with care. For example, you may want to assess an elderly person who has suddenly become unbalanced when using a regular walking aid. In this case you need to assess the patient standing with the aid, yet you must also ensure safety. Similar caution needs to be taken when assessing a client with a recent injury. With such patients—particularly those with injury in the lumbar spine, pelvis or lower limbs—weight bearing or a change in posture may aggravate discomfort. Some clients may be unsettled by how close you are to them during a postural assessment; with such clients, you should clearly explain your intention and the purpose behind the assessment.

Postural assessment can be very useful in hospital settings. For example, it would be helpful to assess a patient who has suffered the sudden trauma of a stroke. However, because such a patient is likely to have an abnormal increase or decrease in muscle tone, the section What Your Findings Mean within this text will not apply. Those sections address the effects of postural imbalance on healthy people rather than those suffering from sudden trauma. Similarly, using this book to assess the posture of a person suffering a degenerative condition such as Parkinson's disease will provide useful information, but not as useful as information gained from using tools specifically designed for people suffering from this condition. Clients suffering conditions that affect the normal functioning of the nervous and muscular systems are better assessed using assessment tools specifically designed for the assessment of their conditions.

Where Can Postural Assessment Take Place?

Because postural assessment usually requires that clients be in their underwear, a warm clinic or treatment room is the best location. However, important information can be gained about a client who sits for long periods of time by observing her seated posture at work. In this case, the person will be clothed. Although this will not provide as much information as when you can see the position of the client's joints, it gives a useful overall impression of whether musculoskeletal pain may be due to poor seated posture.

When Should Postural Assessment Be Done?

Postural assessment is usually performed following the consultation and once you have important information about your client's medical history. It is important to take the medical history first because something may come to light that affects whether you perform the postural assessment. For example, if a client reports having dizzy spells when he stands too long, you might carry out the assessment more quickly than usual, or have an assistant on hand and a chair close by. Or you might decide not to do the assessment at all.

Some therapists like to reassess posture following each treatment, but of course, this depends on how often you are seeing that client and the nature of your treatment. Your intervention may be a one-off treatment, in which case you need to do the assessment before and after treatment, or it may comprise a series of treatments and home care exercises over a period of time. In this case, it would be more appropriate to assess posture initially and then later, once you and the patient have had a chance to implement the treatment plan. It may not be necessary to assess the entire posture, or even to do a postural assessment at all. However, if you are keen to see whether intensive treatment and exercise have relieved the problem you believe to be the result of poor posture, you will certainly want to reassess your client at some stage.

Closing Remarks

This chapter has introduced you to the concept of postural assessment and some of the factors affecting it. Hopefully, it has also answered some of your initial questions about this topic. Chapter 2 prepares you to undertake your first assessment.

Quick Questions

1. What are three factors that affect posture?
2. What are two reasons for doing a postural assessment?
3. What are two examples of when a general postural assessment (as described in this text) might not be appropriate?
4. In most cases, why is it important to take a medical history before carrying out a postural assessment?
5. When analysing various parts of the body and how they fit together, why is it important to always take an overall view of the client?

2

Preparing for Postural Assessment

Let's now prepare to carry out the assessment. In this chapter you will find information on how to carry out the assessment, the equipment required, how long it should take, plus an outline of what to look for in general terms. You will also find a more detailed description of the standard (ideal) postural alignments, images of which you should hold in your mind when carrying out your assessments as you work through subsequent chapters. Here, too, are ideas for how to document your findings and some general cautions and safety issues to consider before you start.

Equipment Required

The following equipment is useful when learning to carry out postural assessments:

- A warm, private room
- A full-length mirror
- Body crayons (and cleansing wipes)
- Postural assessment charts
- A model skeleton

TIP It is a good idea to have your own posture assessed, perhaps by a colleague working through the steps in this book. In this way, you can experience what it feels like to be the subject of the assessment and will be better informed when performing the procedure yourself.

Body crayons are helpful to have at hand. Crayons used for children's face painting are inexpensive and readily available from most stores selling party supplies. They are also usually non-toxic and hypoallergenic, but do check with your client before using them. You might want to start by practising on family and friends. Use the crayons to mark bony landmarks on the client to help you judge the distances of these structures from the midline of the body, the angles of bones and joints, and the relationships they form with one another. Try marking the following points, which are all on the back of the body:

- Medial border of the scapula
- Inferior angle of the scapula
- Spinous processes of the spine
- Olecranon process of the elbow
- Posterior superior iliac spine (PSIS)
- Knee creases
- Midline of the calf
- Midline of the Achilles tendon

If you choose to use crayons, remember to have some cleansing wipes at hand to remove your marks.

It is helpful to have some kind of chart on which to record your observations and to serve as a prompt so you know what to look for. Sample charts are provided for posterior, lateral and anterior assessments in the appendix (page 141). These match the step-by-step assessments in chapters 3, 4, 5 and 6. Finally, having a full-size model skeleton at hand will be helpful for reminding you of anatomical structures, their size and their placement.

TIP If you are using a model skeleton that is supported on a base stand (rather than hanging), it is likely to be constructed with a central pole running through the bodies of the vertebrae. This means that the spine of your model does not depict the normal lordotic and kyphotic curves we all have; in your model the curves are flattened.

Time Required

If you are new to postural assessment, you may find that you need at least 30 minutes to do a full assessment including anterior, posterior and lateral views. With practice, you can assess the whole body, from all angles, in five minutes or less. A skilled practitioner carries out a general postural assessment quickly, noting only very obvious deviations from the standard posture. When a client presents an ongoing or unresolved problem, or when you are assessing as part of rehabilitation, you will need to take greater care to establish whether postural imbalances are contributing to the problem or are likely to become problematic in the future. In this case the assessment may take longer.

Postural Assessment Steps

Once you have established that a postural assessment will be useful and that the client understands what this involves, you are ready to begin. The client should stand in her underwear, and have hair tied up if it obscures the face and neck. It is a good idea for female clients to wear a normal bra rather than a sport bra because sport bras can obscure the scapulae and spine at the back, making observation of this part of the body more difficult. Because you want to observe the everyday stance of your client, instruct her to adopt her usual standing posture rather than have her position her feet in any particular way.

To begin, hold in mind some general questions regarding your client's body. Table 2.1 provides some suggestions. The questions here are designed as prompts and are not exhaustive.

Most people feel vulnerable when asked to stand unclothed to have their bodies analysed in this way. Yet this is an assessment procedure that usually takes place at the start of the therapeutic relationship. How such a procedure is conducted can be critical

Table 2.1 General Questions Regarding Your Client's Body

Overall stance	■ Is the weight equally distributed through the lower limbs or shifted to one side? ■ Does the client look balanced or unbalanced? ■ Does the client appear to be swaying forwards, backwards or to one side?
Alignment of body parts	■ Does each component of the body seem balanced with relation to other parts? ■ Is the head centred over the thorax? ■ Is the thorax centred over the pelvis? ■ Are the limbs equidistant from the trunk?
Bones	■ Do bones appear normally shaped? ■ Do any bones appear misshapen, bowed or damaged?
Joints	■ Do joints appear to be in their neutral, resting positions, or is there any mal-alignment? ■ Do any joints appear swollen?
Muscles	■ Is there equal bulk on the left and right sides of the body? ■ Is there noticeable hypertrophy or atrophy anywhere? ■ Does there appear to be an increase or a decrease in muscle tone anywhere?
Skin	■ Are there any areas of inflammation, discolouration or dryness? ■ Are there any scars, blemishes or bruising?
Physical attitude	■ Does the client look comfortable? ■ Does the client appear to be able to maintain the posture with ease? ■ Are there any areas of tension?

in determining whether trust and rapport are established between the patient and the therapist. Although you have your own bedside manner, and will approach this form of assessment in a way that matches your individuality as a practitioner, it does not hurt to remember the importance of making your observations as non-judgemental as possible.

Observations that to you may seem commonplace and a matter of fact may have huge emotional significance for the patient. Acknowledge these emotions, and take care to make your observations sensitively. Working supportively and without criticism is as important during the postural assessment as they are during the treatment, rehabilitation and education components of your work. Best results are achieved when clients feel safe and calm, perhaps even curious about your observations of their posture. Without their trust and confidence, you will never get a really true picture of their posture.

Standard Alignments

As you learned in chapter 1, in this book you are going to compare your observations with a traditional image of good postural alignment. However, rather than describe this as the ideal alignment, we're going to adopt the term used by Kendall, Kendall and Boynton (1952) and refer to it as *standard* alignment. The illustrations in this book have traditionally been used as a benchmark against which to make observations regarding posture. These images have been chosen as representative of optimal body alignment because in this upright position compressive forces are distributed evenly over the surfaces of joints.

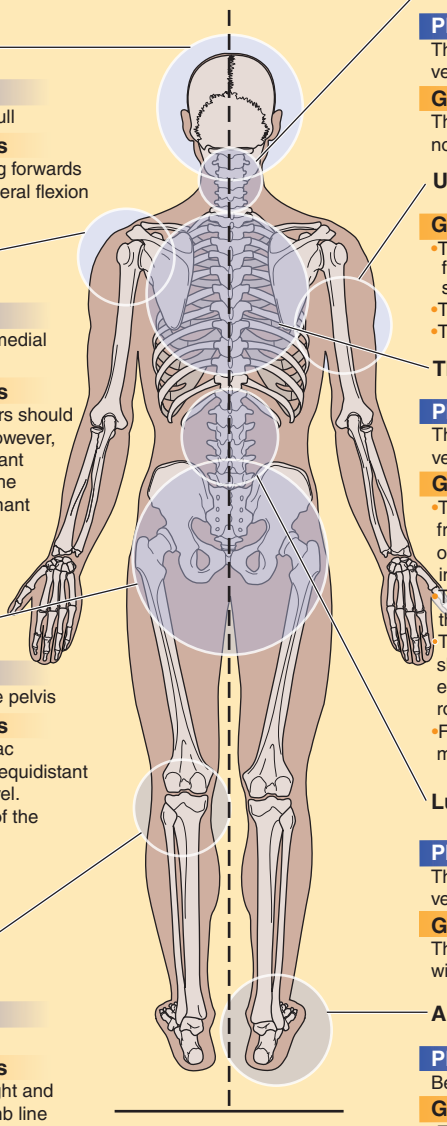
The alignment of joints as shown in these images does not require any increase in tension in soft tissues, and little work is required by muscles other than to correct postural sway. Deviations from this optimal joint alignment increase the stress on ligaments and require that muscles exert more effort not just in the associated joint but usually in the joints above and below the affected part, as part of the body's corrective mechanism. If mal-alignment persists— that is, deviations from the positions illustrated here—detrimental structural changes may occur.

With joints aligned in this 'ideal' way, ligaments counter any tendency for joints to flex or extend. Where there are no ligaments to do this, muscles fire intermittently to counter any joint deviations. The muscles increase their energy expenditure only if the joint falls very anterior or very posterior to the plumb line, or line of gravity, or if they are required to maintain a position of imbalance indefinitely. An excellent and comprehensive text describing the anatomy and function of all joints is *Joint Structure and Function* (Levangie and Norkin 2001). For information on the static and dynamic control of posture, see chapter 13 of that text.

The figures in the sidebar shown on pages 19, 20 and 21 outline where a plumb line (shown as the vertical black line in the illustrations) should fall with respect to various parts of the body, and provide general observations for when postures are said to be good, or ideal. Illustrations within this sidebar show standard alignments for the posterior, lateral and anterior views of the body. If you wish to skip this section, you could turn to the detailed step-by-step instructions explaining what to observe in each of these views in chapters 3, 4 and 5.

Standard Alignments

Standard Posterior Alignment



Head

Plumb Line
Through midline of the skull

General Observations
The head should be facing forwards with no rotation and no lateral flexion

Shoulders

Plumb Line
Equidistant between the medial borders of the scapulae

General Observations
The height of the shoulders should be approximately level. However, the shoulder of the dominant hand may be lower than the shoulder of the non-dominant hand.

Pelvis and thigh

Plumb Line
Through the midline of the pelvis

General Observations
- The posterior superior iliac spines (PSIS) should be equidistant from the spine and be level.
- The greater trochanters of the femurs should be level.
- The buttock creases should be level and equal.

Knees and legs

Plumb Line
Between the knees

General Observations
- The legs should be straight and equidistant from the plumb line with no genu varum or genu valgum.
- Calf bulk should be equal on the left and right legs.

Neck

Plumb Line
Through midline of all cervical vertebrae

General Observations
The neck should appear straight with no lateral flexion.

Upper limbs

General Observations
- The arms should hang equidistant from the trunk, palms facing the sides of the body.
- The elbows should be level.
- The wrists should be level.

Thorax and scapulae

Plumb Line
Through midline of all thoracic vertebrae

General Observations
- The scapulae should be equidistant from the spine, the medial borders of each approximately 1.5 to 2 inches (3.8 to 5 cm) from the spine.
- The scapulae should lie flat against the rib cage with no anterior tilting.
- The inferior angles of the scapulae should be level, with no evidence of elevation, depression, or scapular rotation.
- Flare in the rib cage should be symmetrical left and right.

Lumbar spine

Plumb Line
Through midline of all lumbar vertebrae

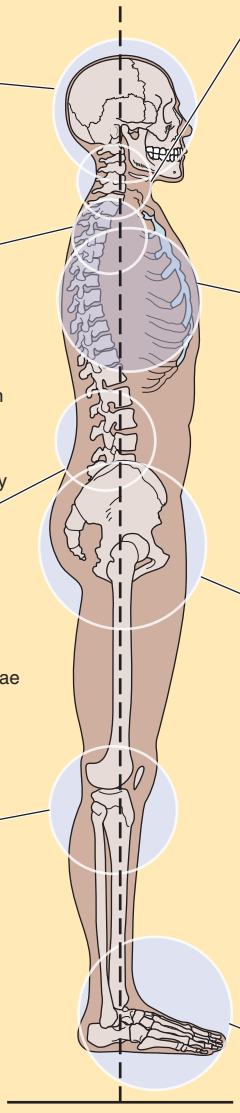
General Observations
The lumbar spine should be straight with no curvature to the right or left.

Ankle and feet

Plumb Line
Between the medial malleoli

General Observations
- The lateral malleoli should be level.
- The medial malleoli should be level.
- The Achilles tendon should be vertical.
- The calcaneus should be vertical.
- The feet should be turned out slightly.

Standard Lateral Posture



Head

Plumb Line
Through the earlobe

General Observations
The head should appear positioned over the thorax—neither pushed forwards with chin out nor pulled back.

Shoulders

Plumb Line
Through the shoulder joint: specifically, through the acromion process (not shown on this illustration)

General Observations
The shoulders should be neither internally nor (in rare cases) externally rotated.

Lumbar spine

Plumb Line
Through the bodies of the lumbar vertebrae

General Observations
The lumbar spine should have a normal lordotic curve that is neither exaggerated nor flattened.

Knees and legs

Plumb Line
Slightly anterior to the knee joint

General Observations
There should be neither flexion nor hyperextension at this joint in standing.

Neck

Plumb Line
Through the bodies of most of the cervical vertebrae

General Observations
- The cervical spine should have a normal lordotic curve that is neither exaggerated nor flattened.
- There should be no deformity at the cervicothoracic junction such as a dowager's hump.

Thorax and scapulae

Plumb Line
Midway through the trunk

General Observations
- There should be a normal kyphotic curve in this region that is neither exaggerated nor flattened.
- The chest should be held comfortably upright and not excessively elevated (military posture) nor depressed.

Pelvis and thigh

Plumb Line
Through the greater trochanter of the femur

General Observations
- The pelvis should be in a neutral position. That means the anterior superior iliac spine (ASIS) is in the same vertical plane as the pubis.
- The ASIS and the PSIS should be approximately in the same plane. There should be no anterior or posterior pelvic tilt.
- Gluteal and thigh muscle bulk should appear equal on both the left and right sides.

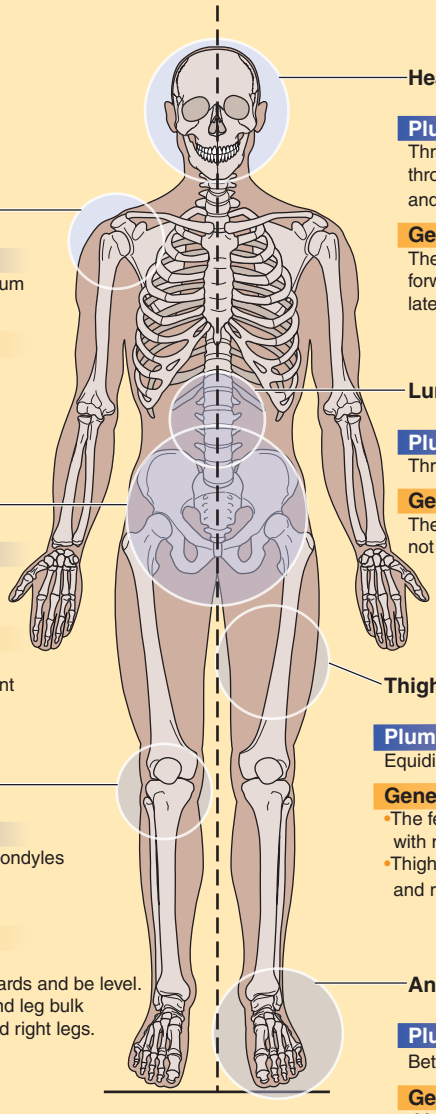
Ankle and feet

Plumb Line
Slightly anterior to the lateral malleolus

General Observations
There should be normal dorsiflexion at the ankle.

It is important to remember that although the plumb line in the lateral view should run vertically through the earlobe and bodies of most cervical vertebrae, when being set up for use as a marker, it is positioned slightly anterior to the lateral malleolus and *not* against the earlobe, cervical vertebrae, acromion or other structures listed here. Remember, this is an ideal posture, showing where, ideally, the plumb line ought to bisect the body in such a way that equal portions of the body appear anterior and posterior of the plumb line.

Standard Anterior Alignment



Head

Plumb Line
Through the centre of the face: through the forehead, nose and chin

General Observations
The head should be facing forwards with no rotation and no lateral flexion.

Shoulders

Plumb Line
Through the manubrium, sternum and xyphoid process

General Observations
- The shoulders should be approximately level.
- The clavicles should be level.

Lumbar spine

Plumb Line
Through the umbilicus (navel)

General Observations
The umbilicus should be central, not deviated to the left or right.

Pelvis

Plumb Line
- Bisecting the pelvis
- Through the pubic symphysis

General Observations
- The ASIS should be level.
- The ASIS should be equidistant from midline.

Thighs

Plumb Line
Equidistant between thighs

General Observations
- The femurs should be straight and with no internal or external rotation.
- Thigh bulk should be equal on left and right sides.

Knees and legs

Plumb Line
- Between the medial femoral condyles of the knees
- Equidistant between the legs

General Observations
- Knees should be level.
- The patellae should face forwards and be level.
- The tibia should be straight and leg bulk should be equal on the left and right legs.

Ankle and feet

Plumb Line
Between the medial malleoli

General Observations
- Medial malleoli should be level
- Feet should turn out from the midline.

The Plumb Line

The plumb line represents the line of gravity; it is a vertical line drawn from the body's centre of gravity to within the body's base of support. The human centre of gravity is just anterior to the second sacral vertebra. Although the plumb line is included in these illustrations, many who carry out postural assessments believe that practitioners ought to focus more on the relationship between one body part and another, rather than on the relationship between a particular body part and the plumb line.

Traditionally, a plumb line has been used in the analysis of posture by positioning the client against it in such a way that the plumb line falls equidistant from the medial malleoli when viewing a client anteriorly or posteriorly, and anterior to (about 1 inch, or 2.5 cm, in front of) the lateral malleolus when viewing the client laterally. To ensure that their clients were positioned correctly, practitioners placed the feet of their clients on a card or plinth that had the outline of two feet painted on it. However, this approach has been criticised because it could result in clients being forced to adopt foot positions that are abnormal for them. In reality, a client may have a naturally wider (or narrower) stance than the painted foot positions allow, or may stand with his feet turned out or in to a greater or lesser degree than the foot positions allow. Although the use of a plumb line (without forced foot positions) is valuable in carrying out research into posture, and specialist practitioners may use it (along with gridded background paper to measure the alignment of body parts on the horizontal plane), in practice, it is not necessary and may even be cumbersome.

TIP Traditionally, the client's head is supposed to sit nicely above the thorax with the plumb line falling through the ears and the acromion. However, because the shoulder joint is a mobile structure, if the scapula is protracted (as is often the case), the head may appear to be in the wrong position relative to the plumb line when, in fact, it is the scapula that is out of alignment.

Identifying the 'standard' seated posture is difficult because it does not exist. Seating needs to accommodate the needs of the client and what she is doing while seated. Images such as the one shown in figure 2.1 recommend that the hips be flexed to a certain degree, but this assumes that the client is sitting at a desk and not, for example, driving a train, using the toilet or eating a meal. Generally speaking, it is accepted that posture is less likely to be compromised when the head is positioned over the thorax, the lumbar spine is supported with the knees comfortably flexed, and the feet are flat on the floor.

Documenting Your Findings

As you perform your postural assessment, you are going to want to document your findings. There are many ways to do this. The most common method is simply to write out your findings in longhand. By complete contrast, you could speak your findings

a *b* *c*

Figure 2.1 Some common seating recommendations. Positions *a* and *c* should be avoided, and position *b* places less stress on the spine and soft tissues.

Neutral Pelvic Positions

Before moving on, I want to clarify what I mean by a neutral pelvis. A neutral pelvis is one in which the left and right iliac crests, the left and right posterior superior iliac spines (PSIS) and the left and right ischia are level when viewed posteriorly, as in figure 2.2.

When viewed from the side, the ASIS and the pubis should be approximately in the same plane (Anderson 1978), as in figure 2.3.

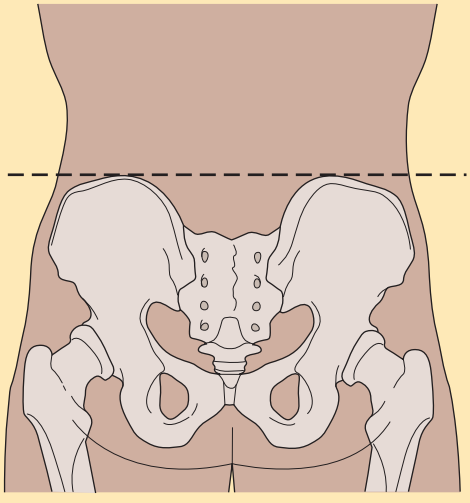


Figure 2.2 Neutral pelvis viewed posteriorly.

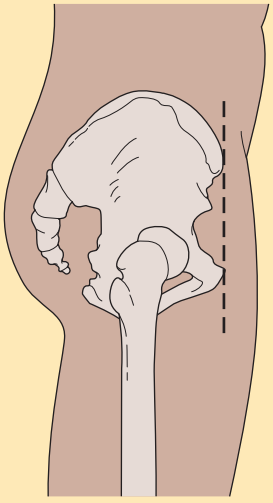


Figure 2.3 Neutral pelvis viewed laterally.

into a recorder, or if carrying postural assessment as part of research, you could ask your participant to sign a release form granting you permission to take photographs that you later analyse. Audio-recording information is quick and easy, but it is likely to be distracting for the client to whom you may not wish to reveal your findings just yet. Photographs enable you to take your time over the assessment, but they are no substitute for having the client in front of you. Many participants were photographed for selection of images used in this book. One of the advantages of assessing posture in this way was that I was able to take my time with each photograph to identify those deviations in posture that would best support the information in the text. One of the disadvantages is that a photograph retains only a certain amount of clarity and is not life size.

How you record information depends on which method is most appropriate for you. A visually impaired therapist, for example, may 'observe' a client by palpation. The therapist may assess the relationships among various body parts using her hands while audio-recording her findings to transcribe later. In some clinical settings therapists are required to document their findings using standardised forms. Clinical trials often require clinicians to record deviations from the standard postural views using measuring devices such as rulers and goniometers. In everyday practice, most therapists simply note whether any deviations they observe are mild, moderate or marked. Often, arrows or shading are used to indicate deviation of a body part or an increase in muscle tone. To get started, you will find postural assessment charts in the appendix.

Cautions and Safety Issues

There are few contraindications to carrying out a postural assessment. It is not advisable if a client has pain on prolonged standing (or prolonged sitting if you are doing the seated postural assessment in chapter 6). Clients with low blood pressure may get dizzy if asked to stand for too long, so have a chair at hand. Take care when examining clients who can stand without discomfort but who feel unbalanced. This is particularly common among elderly people or clients who are recovering from an injury or surgery to the lower limbs and have only recently started fully bearing their weight.

Make sure your clients are appropriately disrobed before you start the assessment. The elderly man on page 4 preferred to keep his vest top on because he had recently suffered a fall and was badly bruised. If he were being assessed for the bruising, I would have asked him to remove his top, but I knew that asking him to do this himself while standing and with a walking stick in one hand was dangerous.

Finally, if you are using face crayons to mark up your client's body, you need to check that your client is not allergic to them. Allergic reactions to these crayons are rare. However, if you see increased blood flow to the skin where you are using the crayon, remove the marks you've made.

Closing Remarks

Now that you are fully prepared, it's time to carry out your first assessment. Choose either the posterior, lateral or anterior view, and turn to the appropriate chapter for your step-by-step guide.

Quick Questions

1. What are four useful pieces of equipment to have when carrying out a postural assessment?
2. What bony landmarks are useful to identify before starting a posterior postural assessment?
3. What are five general questions to ask yourself concerning the client's overall stance, alignment, bones, joints, muscles, skin and physical attitude?
4. What is a neutral pelvis?
5. What are some possible contraindications to postural assessment?