

# Principles and Concepts

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A musculoskeletal assessment requires a proper and thorough systematic examination of the patient. A correct diagnosis depends on a knowledge of functional anatomy, an accurate patient history, diligent observation, and a thorough examination. The differential diagnosis process involves the use of clinical signs and symptoms, physical examination, a knowledge of pathology and mechanisms of injury, provocative and palpation (motion) tests, and laboratory and diagnostic imaging techniques. It is only through a complete and systematic assessment that an accurate diagnosis can be made. The purpose of the assessment should be to fully and clearly understand the patient's problems, from the patient's perspective as well as the clinician's, and the physical basis for the symptoms that have caused the patient to complain. As James Cyriax stated, "Diagnosis is only a matter of applying one's anatomy."<sup>1</sup>

One of the more common assessment recording techniques is the problem-oriented medical records method, which uses "SOAP" notes.<sup>2</sup> SOAP stands for the four parts of the assessment: Subjective, Objective, Assessment, and Plan. This method is especially useful in helping the examiner to solve a problem. In this book, the subjective portion of the assessment is covered under the heading Patient History, objective under Observation, and assessment under Examination.

Although the text deals primarily with musculoskeletal physical assessment on an outpatient basis, it can easily be adapted to evaluate inpatients. The primary difference is in adapting the assessment to the needs of a bedridden patient. Often, an inpatient's diagnosis has been made previously, and any continuing assessment is modified to determine how the patient's condition is responding to treatment. Likewise, an outpatient is assessed continually during treatment, and the assessment is modified to reflect the patient's response to treatment.

Regardless of which system is selected for assessment, the examiner should establish a **sequential method** to ensure that nothing is overlooked. The assessment must be organized, comprehensive, and reproducible. In general, the examiner compares one side of the body, which is assumed to be normal, with the other side of the body, which is abnormal or injured. For this reason, the examiner must come to understand and know the wide variability in what is considered normal. In addition, the examiner should focus attention on only one aspect of the assessment at a time, for example, ensuring a

thorough history is taken before completing the examination component. When assessing an individual joint, the examiner must look at the joint and injury in the context of how the injury may affect other joints in the kinetic chain. These other joints may demonstrate changes as they try to compensate for the injured joint.

Each chapter ends with a summary, or *précis*, of the assessment procedures identified in that chapter. This section enables the examiner to quickly review the pertinent steps of assessment for the joint or structure being assessed. For further information, the examiner can refer to the more detailed sections of the chapter.

## Total Musculoskeletal Assessment

- Patient history
- Observation
- Examination of movement
- Special tests
- Reflexes and cutaneous distribution
- Joint play movements
- Palpation
- Diagnostic imaging

## Patient History

Ideally, the environment for the assessment should be private and as free of distractions as possible. The examiner should always introduce himself or herself to the patient and then sit beside or in front of the patient to enhance the notion that the examiner is focused on the patient. Showing kindness and respect help to create an environment that facilitates the exchange of information.<sup>3</sup>

A complete medical and injury history should be taken and written to ensure reliability. This requires effective and efficient communication on the part of the examiner and the ability to develop a good rapport with the patient and, in some cases, family members and other members of the health care team. This includes speaking at a level and using terms the patient will understand (common sense questions); taking the time to listen; and being empathic, interested, caring, and professional.<sup>4</sup> Naturally, emphasis in taking the

history should be placed on the portion of the assessment that has the greatest clinical relevance. Often the examiner can make the diagnosis by simply *listening to the patient*.<sup>5,6</sup> This really means the patient, with the appropriate prompting, will tell the clinician about the complex symptoms that lead the clinician to make the appropriate diagnosis.<sup>6</sup> No subject areas should be skipped. Repetition helps the examiner to become familiar with the characteristic history of the patient's complaints so that unusual deviation, which often indicates problems, is noticed immediately. Even if the diagnosis is obvious, the history provides valuable information about the disorder, its present state, its prognosis, and the appropriate treatment. The history also enables the examiner to determine the type of person the patient is, his or her language and cognitive ability, the patient's ability to articulate, any treatment the patient has received, and the behavior of the injury. In addition to the history of the present illness or injury, the examiner should note relevant past history, treatment, and results. Past medical history should include any major illnesses, surgery, accidents, or allergies. In some cases, it may be necessary to delve into the social and family histories of the patient if they appear relevant. Lifestyle habit patterns, including sleep patterns, stress, workload, and recreational pursuits, should also be noted.

In every patient/client scenario, a person's personality and mental state at the time of illness or injury may influence his or her recall abilities.<sup>7</sup> That being said, a patient may forget, underreport, or combine separate health events into a single memory, a process called **telescoping**. Telescoping can include events that are too recent for the target time period (backward telescoping), or events that are too old for the target time period (forward telescoping). To help remedy this, instead of asking a question such as "Have you had back pain for longer than a year," it might be better to ask "Did you have back pain on your last birthday?"

One of the most common interviewing errors is letting the patient control the interview. It is important that the examiner politely but firmly keeps the patient focused and discourages irrelevant information. Questions and answers should provide practical information about the problem. In addition, the examiner should listen for any potential **red flag** signs and symptoms (Table 1.1) that would indicate the problem is not a musculoskeletal one or could be more serious pathology that should be referred to the appropriate health care professional.<sup>8–10</sup> Serious systemic pathology may be indicated by sweating, pallor/flushing, sallow/jaundiced complexion, tremors/shaking, increased body temperature, and altered blood pressure. A lone red flag would not necessarily indicate serious pathology. It should be considered in the context of the individual's history and the findings of assessment.<sup>10</sup> **Yellow flag** signs and symptoms are also important for the examiner to note as they denote problems that may be more severe or may involve more than one area requiring a more extensive examination, or they may relate to cautions and contraindications to treatment that the examiner might have to consider, or they may indicate overlying psychosocial issues that may affect treatment.<sup>11</sup>

**TABLE 1.1**  
Red Flag Findings in Patient History That Indicate Need for Referral to Physician

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cancer                             | <ul style="list-style-type: none"> <li>• Persistent pain at night</li> <li>• Constant pain anywhere in the body</li> <li>• Unexplained weight loss (e.g., 4.5–6.8 kg [10–15 lbs] in 2 weeks or less) (5% or more in 4 weeks)</li> <li>• Loss of appetite</li> <li>• Unusual lumps or growths</li> <li>• Unwarranted fatigue</li> <li>• Change in bowel or bladder habits</li> <li>• Sores that will not heal</li> <li>• Unusual bleeding or discharge</li> <li>• Obvious change in wart or mole</li> <li>• Nagging cough or hoarseness</li> </ul> |
| Cardiovascular                     | <ul style="list-style-type: none"> <li>• Shortness of breath</li> <li>• Dizziness</li> <li>• Pain or a feeling of heaviness in the chest</li> <li>• Pulsating pain anywhere in the body</li> <li>• Constant and severe pain in lower leg (calf) or arm</li> <li>• Discolored or painful feet</li> <li>• Swelling (no history of injury)</li> </ul>                                                                                                                                                                                                |
| Gastrointestinal/<br>Genitourinary | <ul style="list-style-type: none"> <li>• Frequent or severe abdominal pain</li> <li>• Frequent heartburn or indigestion</li> <li>• Frequent nausea or vomiting</li> <li>• Change in or problems with bowel and/or bladder function (e.g., urinary tract infection), incontinence</li> <li>• Unusual menstrual irregularities</li> </ul>                                                                                                                                                                                                           |
| Miscellaneous                      | <ul style="list-style-type: none"> <li>• Fever or night sweats</li> <li>• Recent severe emotional disturbances</li> <li>• Swelling or redness in any joint with no history of injury</li> <li>• Pregnancy</li> </ul>                                                                                                                                                                                                                                                                                                                              |
| Neurological                       | <ul style="list-style-type: none"> <li>• Changes in hearing</li> <li>• Frequent or severe headaches with no history of injury</li> <li>• Problems with swallowing or changes in speech</li> <li>• Changes in vision (e.g., blurriness or loss of sight)</li> <li>• Problems with balance, coordination, or falling</li> <li>• Fainting spells (drop attacks)</li> <li>• Sudden weakness</li> <li>• Bilateral pins and needles</li> </ul>                                                                                                          |

Adapted from Stith JS, Sahrman SA, Dixon KK, et al. Curriculum to prepare diagnosticians in physical therapy. *J Phys Ther Educ*. 1995;9:50.

The patient's history is usually taken in an orderly sequence. It offers the patient an opportunity to describe the problem and the limitations caused by the problem as he or she perceives them. To achieve a good functional outcome, it is essential that the clinician heed to the patient's concerns and expectations for treatment. After all, the history is the patient's report of his or her own condition. Sometimes, patients' reported outcomes are included as part of the history. These outcomes give the status of the patient's health and problems and are given directly by the patient and how the problem(s) affects the patient's quality of life.<sup>12</sup> The clinician should ask questions that are easy to understand and should not lead the patient. For example, the examiner should not say, "Does this

increase your pain?” It would be better to say, “Does this alter your pain in any way?” The examiner should ask one question at a time and receive an answer to each question before proceeding with another question. Open-ended questions, those that elicit more than a single-word response,<sup>13</sup> ask for narrative information; closed-ended or direct questions ask for specific information. Direct questions are often used to fill in details of information given in open-ended questions, and they frequently require only a one-word answer, such as yes or no. It is best to use a combination of both open- and closed-ended questions during the patient interview. Each has its advantages and disadvantages. Open-ended are best to allow the patients to tell their story about their condition. The disadvantage of open-ended questions is that the patient may control the conversation. Closed-ended questions are best when clarifying or obtaining the answer to very specific questions. However, if utilized too early in the interview, closed-ended questions may become leading and yield inaccurate information.<sup>14</sup> In any musculoskeletal assessment, the examiner should seek answers to the following pertinent questions.

#### **Yellow Flag Findings in Patient History That Indicate a More Extensive Examination May Be Required**

- Abnormal signs and symptoms (unusual patterns of complaint)
- Bilateral symptoms
- Symptoms peripheralizing
- Neurological symptoms (nerve root or peripheral nerve)
- Multiple nerve root involvement
- Abnormal sensation patterns (do not follow dermatome or peripheral nerve patterns)
- Saddle anesthesia
- Upper motor neuron symptoms (spinal cord) signs
- Fainting
- Drop attacks
- Vertigo
- Autonomic nervous system symptoms
- Progressive weakness
- Progressive gait disturbances
- Multiple inflamed joints
- Psychosocial stresses
- Circulatory or skin changes

1. *What is the patient's age and sex?* Many conditions occur within certain age ranges. For example, various growth disorders, such as Legg-Perthes disease or Scheuermann disease, are seen in adolescents or teenagers. Degenerative conditions, such as osteoarthritis and osteoporosis, are more likely to be seen in an older population. Shoulder impingement in young people (15 to 35 years) is more likely to result from muscle weakness, primarily in the muscles controlling the scapula, whereas the condition in older people (40+ years) is more likely to be the result of degenerative changes in the shoulder complex. Some conditions show sex and even race differences. For example,

some cancers are more prevalent in men (e.g., prostate, bladder), whereas others occur more frequently in women (e.g., cervical, breast), yet still others are more common in white people.

2. *What is the patient's occupation?* What does the patient do at work? What is the working environment like? What are the demands and postures assumed?<sup>15</sup> For example, a laborer probably has stronger muscles than a sedentary worker and may be less likely to suffer a muscle strain. However, laborers are more susceptible to injury because of the types of jobs they have. Because sedentary workers usually have no need for high levels of muscle strength, they may overstress their muscles or joints on weekends because of overactivity or participation in activity that they are not used to. Habitual postures and repetitive strain caused by some occupations may indicate the location or source of the problem.
3. *Why has the patient come for help?* This is often referred to as the **history of the present illness** or **chief complaint**.<sup>3</sup> This part of the history provides an opportunity for patients to describe in their own words what is bothering them and the extent to which it bothers them. It is important for the clinician to determine what the patient wants to be able to do functionally and what the patient is unable to do functionally. In other words, is there a functional limitation? It is often this functional limitation that leads the patient to seek help. It is also essential to ensure that the clinician knows what is important to the patient in terms of outcome, whether the patient's expectations for the following treatment are realistic, and what direction functional treatment should take to ensure the patient can, if at all possible, return to his or her previous level of activity or realize his or her expected outcome.<sup>16</sup>
4. *Was there any inciting trauma (macrotrauma) or repetitive activity (microtrauma)?* In other words, what was the **mechanism of injury**, and were there any predisposing factors? If the patient was in a motor vehicle accident, for example, was the patient the driver or the passenger? Was he or she the cause of the accident? What part of the car was hit? How fast were the cars going? Was the patient wearing a seat belt? When asking questions about the mechanism(s) of injury, the examiner must try to determine the direction and magnitude of the injuring force and how the force was applied. By carefully listening to the patient, the examiner can often determine which structures were injured and how severely by knowing the force and mechanism of injury. For example, anterior dislocations of the shoulder usually occur when the arm is abducted and laterally rotated beyond the normal range of motion (ROM), and the “terrible triad” injury to the knee (i.e., medial collateral ligament, anterior cruciate ligament, and medial meniscus injury) usually results from a blow to the lateral side of the knee while the knee is flexed, the full weight of the patient is on the knee, and the foot is fixed. Likewise, the examiner should determine whether there were any predisposing, unusual, or new factors (e.g., sustained postures or

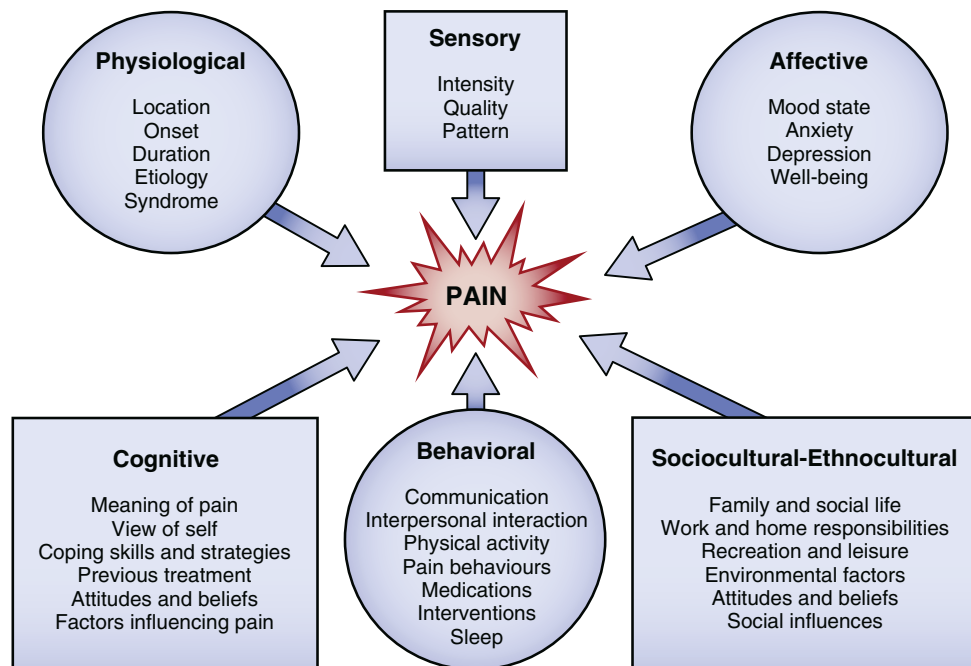


**Figure 1.1** The dimensions of pain. (Redrawn from Petty NJ, Moore AP. *Neuromusculoskeletal Examination and Assessment: A Handbook for Therapists*. Churchill-Livingstone; 1998:8.)

repetitive activities, general health, or familial or genetic problems) that may have led to the problem.<sup>17</sup>

5. *Was the onset of the problem slow or sudden?* Did the condition start as an insidious, mild ache and then progress to continuous pain, or was there a specific episode in which the body part was injured? If inciting trauma has occurred, it is often relatively easy to determine the location of the problem. Does the pain get worse as the day progresses? Was the sudden onset caused by trauma, or was it sudden with locking because of muscle spasm (spasm lock) or pain? Is there anything that relieves the symptoms? Knowledge of these facts helps the examiner to make a differential diagnosis.
6. *Where are the symptoms that bother the patient?* If possible, have the patient point to the area. Does the patient point to a specific structure or a more general area? The latter may indicate a more severe condition or referral of symptoms (**yellow flag**). The way in which the patient describes the symptoms often helps to delineate problems. Has the dominant or nondominant side been injured? Injury to the dominant side may lead to greater functional limitations. Are the problems local (e.g., a sprain) or systemic (e.g., rheumatoid arthritis)?
7. *Where was the pain or other symptoms when the patient first had the complaint?* Pain is subjective, and its manifestations are unique to each individual. It is a complex experience involving several dimensions (Fig. 1.1).<sup>18,19</sup> If the intensity of the pain or symptoms is such that the patient is unable to move in a certain direction or hold a particular posture because of the symptoms, the symptoms are said to be severe. If the symptoms or pain become progressively

worse with movement or the longer a position is held, the symptoms are said to be irritable.<sup>20,21</sup> **Acute pain** is new pain that is often severe, continuous, and perhaps disabling and is of sufficient quality or duration that the patient seeks help. Acute injuries tend to be more irritable resulting in pain earlier in the movement, or minimal activity will bring on symptoms, and often the pain will remain after movement has stopped.<sup>4</sup> **Chronic pain** is more aggravating, is not as intense, and has been experienced before, and in many cases, the patient knows how to deal with it. Acute pain is more often accompanied by anxiety, whereas chronic pain is associated with depression.<sup>22</sup> When tissue has been damaged, substances are released leading to inflammation and **peripheral sensitization** of the nociceptors (also called **primary hyperalgesia**) resulting in localized pain. If the injury does not follow a normal healing pathway and becomes chronic, **central sensitization** (also called **secondary hyperalgesia**) may occur. Peripheral sensitization is a local phenomenon, whereas central sensitization is a more central process involving the spinal cord and brain. Central sensitization manifests itself as widespread hypersensitivity to such physical, mental, and emotional stressors as touch, mechanical pressure, noise, bright light, temperature, and medication.<sup>23,24</sup>

Has the pain moved or spread? The location and spread of pain may be marked on a body chart, which is part of the assessment sheet (eAppendix 1.1). The examiner should ask the patient to point to exactly where the pain was and where it is now. Are trigger points present? **Trigger points** are localized areas of hyperirritability within the tissues; they are tender to compression, are often accompanied by

tight bands of tissue, and, if sufficiently hypersensitive, may give rise to referred pain that is steady, deep, and aching. These trigger points can lead to a diagnosis, because pressure on them reproduces the patient's symptoms. Trigger points are not found in normal muscles.<sup>25</sup>

In general, the area of pain enlarges or becomes more distal as the lesion worsens and becomes smaller or more localized as it improves. Some examiners call the former **peripheralization of symptoms** and the latter, **centralization of symptoms**.<sup>26–28</sup> The more distal and superficial the problem, the more accurately the patient can determine the location of the pain. In the case of referred pain, the patient usually points out a general area; with a localized lesion, the patient points to a specific location. **Referred pain** tends to be felt deeply; its boundaries are indistinct, and it radiates segmentally without crossing the midline. The term *referred pain* means that the pain is felt at a site other than the injured tissue because the same or adjacent neural segments supply the referred site. Pain also may shift as the lesion shifts. For example, with an internal derangement of the knee, pain may occur in flexion one time and in extension another time if it is caused by a loose body within the joint. The examiner must clearly understand where the patient feels the pain. For example, does the pain occur only at the end of the ROM, in part of the range, or throughout the ROM?<sup>17</sup>

8. *What are the exact movements or activities that cause pain?* At this stage, the examiner should not ask the patient to do the movements or activities; this will take place during the examination. However, the examiner should remember which movements the patient says are painful so that when the examination is carried out, the patient can do these movements last to avoid an overflow of painful symptoms. With cessation of the activity, does the pain stay the same, or how long does it take for the pain to return to its previous level? Are there any other factors that aggravate or help to relieve the pain? Do these activities alter the intensity of the pain? The answers to these questions give the examiner some idea of the irritability of the joint. They also help the examiner to differentiate between musculoskeletal or mechanical pain and systemic pain, which is pain arising from one of the body's systems other than the musculoskeletal system (Table 1.2).<sup>27</sup> Functionally, pain can be divided into different levels, especially for repetitive stress conditions.

#### Pain and Its Relation to Severity of Repetitive Stress Activity

- Level 1: Pain after specific activity
- Level 2: Pain at start of activity resolving with warm-up
- Level 3: Pain during and after specific activity that does not affect performance
- Level 4: Pain during and after specific activity that does affect performance
- Level 5: Pain with activities of daily living
- Level 6: Constant dull aching pain at rest that does not disturb sleep
- Level 7: Dull aching pain that does disturb sleep

**TABLE 1.2**

#### Differentiation of Systemic and Musculoskeletal Pain

| Systemic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Musculoskeletal                                                                                                                                                                                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Disturbs sleep</li> <li>• Deep aching or throbbing</li> <li>• Reduced by pressure</li> <li>• Constant or waves of pain and spasm</li> <li>• Is not aggravated by mechanical stress</li> <li>• Associated with the following:               <ul style="list-style-type: none"> <li>○ Jaundice</li> <li>○ Migratory arthralgias</li> <li>○ Skin rash</li> <li>○ Fatigue</li> <li>○ Weight loss</li> <li>○ Low-grade fever</li> <li>○ Generalized weakness</li> <li>○ Cyclic and progressive symptoms</li> <li>○ Tumors</li> <li>○ History of infection</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• Generally lessens at night</li> <li>• Sharp or superficial ache</li> <li>• Usually decreases with cessation of activity</li> <li>• Usually continuous or intermittent</li> <li>• Is aggravated by mechanical stress</li> </ul> |

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9. *How long has the problem existed?* What are the duration and frequency of the symptoms? Answers to these questions help the examiner to determine whether the condition is acute, subacute, chronic, or acute on chronic and to develop some understanding of the patient's tolerance to pain. In general, **acute conditions** are those that have been present for 7 to 10 days, **subacute conditions** have been present for 10 days to 7 weeks, and **chronic conditions** or symptoms have been present for longer than 7 weeks. In **acute on chronic** cases, the injured tissues usually have been reinjured. This knowledge is also beneficial in terms of how vigorously the patient can be examined. For example, the more acute the condition, the less stress the examiner is able to apply to the joints and tissues during the assessment. A full examination may not be possible in very acute conditions. In that case, the examiner must select those procedures of assessment that will give the greatest amount of information with the least stress to the patient. Does the patient protect or support the injured part? If so, this behavior signifies discomfort and fear of pain if the part moves, usually indicating a more acute condition.
10. *Has the condition occurred before?* If so, what was the onset like the first time? Where was the site of the original condition, and has there been any radiation (spread) of the symptoms? If the patient is feeling better, how long did the recovery take? Did any treatment relieve symptoms? Does the current problem appear to be the same as the previous problem, or is it different? If it is different, how is it different? Answers to these questions help the examiner to determine the location and severity of the injury.

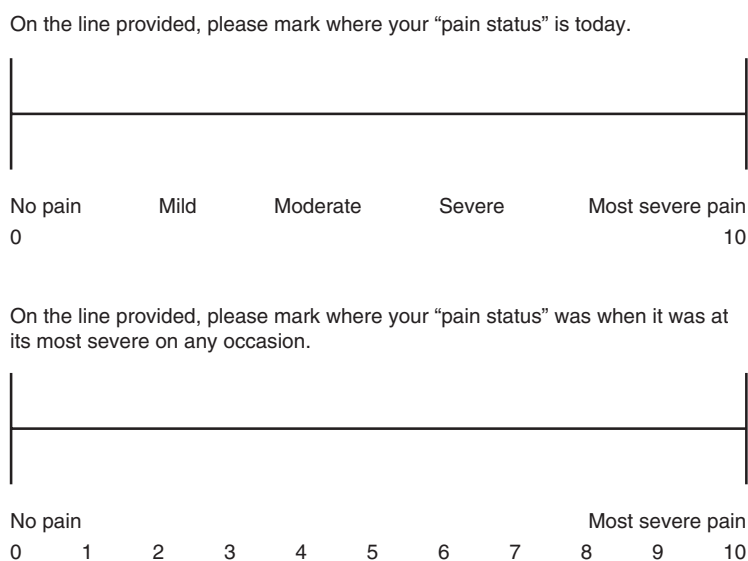


**Figure 1.2** Visual analog scales for pain. Examples only. Note: For an actual examination, the lines would be 10 cm long divided into 1 cm sections.

11. *Has there been an injury to another part of the kinetic chain as well?* For example, foot problems can lead to knee, hip, pelvic, and/or spinal problems; elbow problems may contribute to shoulder problems; and hip problems can contribute to knee problems.
12. *Are the intensity, duration, or frequency of pain or other symptoms increasing?* These changes usually mean the condition is getting worse. A decrease in pain or other symptoms usually means the condition is improving. Is the pain static? If so, how long has it been that way? This question may help the examiner to determine the present state of the problem. These factors may become important in treatment and may help to determine whether a treatment is helping. Are pain or other symptoms associated with other physiological functions? For example, is the pain worse with menstruation? If so, when did the patient last have a pelvic examination? Questions such as these may give the examiner an indication of what is causing the problem or what factors may affect the problem. It is often worthwhile to give the patient a pain questionnaire, visual analog scale (VAS), numeric rating scale, box scale, or verbal rating scale that can be completed while the patient is waiting to be assessed.<sup>29–33</sup> It has been shown that a reduction of approximately 30% change or 2 points (i.e., 2 cm) on a VAS from one test period to the next represents a clinically important difference.<sup>31,34</sup> It is also important to realize that a 1 point intensity change from 8 to 9 represents a greater subjective increase than does an increase from 2 to 3.<sup>34</sup> The McGill-Melzack pain questionnaire and its short form (eTools 1.1 and 1.2)<sup>35–37</sup> provide the patient with three major classes of word descriptors—sensory, affective, and evaluative—to describe their pain experience. These designations are used to differentiate patients who have a true sensory pain experience from those who think they have experienced pain (affective pain state). Other pain-rating scales allow the patient to visually gauge the amount of pain along a solid 10-cm line (VAS) (Fig. 1.2) or on a thermometer-type scale (Fig. 1.3).<sup>38</sup> It has been shown that an examiner should consistently use the same pain scales when assessing or reassessing patients to increase consistent results.<sup>39–42</sup> The examiner can use the completed questionnaire or scale as an indication of the pain as described or perceived by the patient. Alternatively, a self-report pain drawing (see eAppendix 1.1), which (with the training and guidelines of the raters) has been shown to have reliability, can be used for the same purpose.<sup>43</sup>
13. *Is the pain constant, periodic, episodic (occurring with certain activities), or occasional?* Does the condition bother the patient at that exact moment? If the patient is not bothered at that exact moment, the pain is not constant. **Constant pain** suggests chemical irritation, tumors, or possibly visceral lesions.<sup>27</sup> It is always there, although its intensity may vary. If **periodic** or **occasional pain** is present, the examiner should try to determine the activity, position, or posture that irritates or brings on the symptoms, because this may help to determine what tissues are at fault. This type of pain is more likely to be mechanical and related to movement and stress.<sup>27</sup> **Episodic pain** is related to specific activities. At the same time, the examiner should be observing the patient. Does the patient appear to be in constant pain? Does the patient appear to be lacking sleep because of pain? Does the patient move around a great deal in an attempt to find a comfortable position?
14. *Is the pain associated with rest? Activity? Certain postures? Visceral function? Time of day?* Pain on activity that decreases with rest usually indicates a mechanical problem interfering with movement, such as adhesions.

**McGill-Melzack  
PAIN QUESTIONNAIRE**

Patient's name \_\_\_\_\_ Age \_\_\_\_\_  
 File No. \_\_\_\_\_ Date \_\_\_\_\_  
 Clinical category (e.g., cardiac, neurological, etc.): \_\_\_\_\_  
 Diagnosis: \_\_\_\_\_

Analgesic (if already administered):  
 1. Type \_\_\_\_\_  
 2. Dosage \_\_\_\_\_  
 3. Time given in relation to this test \_\_\_\_\_

Patient's intelligence: circle number that represents best estimate  
 1 (low)    2    3    4    5 (high)  
 \*\*\*\*\*

This questionnaire has been designed to tell us more about your pain. Four major questions we ask are:

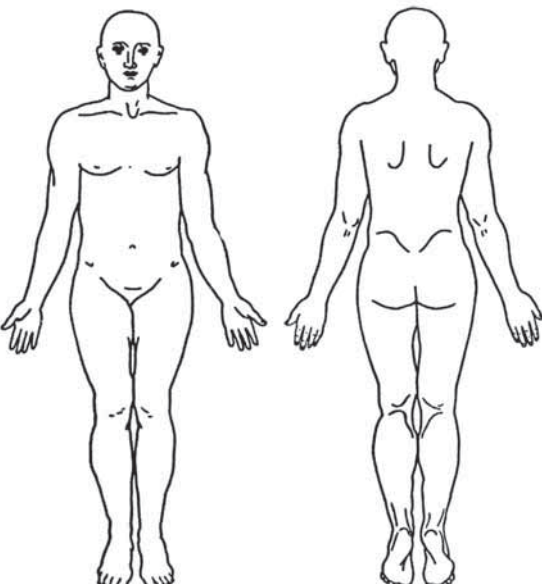
1. Where is your pain?
2. What does it feel like?
3. How does it change with time?
4. How strong is it?

It is important that you tell us how your pain feels now. Please follow the instructions at the beginning of each part.

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**Part 1. Where Is Your Pain?**

Please mark, on the drawings below, the areas where you feel pain. Put E if external, or I if internal, near the areas which you mark. Put EI if both external and internal.



**Part 2. What Does Your Pain Feel Like?**

Some of the words below describe your present pain. Circle ONLY those words that best describe it. Leave out any category that is not suitable. Use only a single word in each appropriate category—the one that applies best.

|              |              |             |              |
|--------------|--------------|-------------|--------------|
| 1 Flickering | 2 Jumping    | 3 Pricking  | 4 Sharp      |
| Quivering    | Flashing     | Boring      | Cutting      |
| Pulsing      | Shooting     | Drilling    | Lacerating   |
| Throbbing    |              | Stabbing    |              |
| Beating      |              | Lancinating |              |
| Pounding     |              |             |              |
| 5 Pinching   | 6 Tugging    | 7 Hot       | 8 Tingling   |
| Pressing     | Pulling      | Burning     | Itchy        |
| Gnawing      | Wrenching    | Scalding    | Smarting     |
| Cramping     |              | Searing     | Stinging     |
| Crushing     |              |             |              |
| 9 Dull       | 10 Tender    | 11 Tiring   | 12 Sickening |
| Sore         | Taut         | Exhausting  | Suffocating  |
| Hurting      | Rasping      |             |              |
| Aching       | Splitting    |             |              |
| Heavy        |              |             |              |
| 13 Fearful   | 14 Punishing | 15 Wretched | 16 Annoying  |
| Frightful    | Crueling     | Blinding    | Troublesome  |
| Terrifying   | Cruel        |             | Miserable    |
|              | Vicious      |             | Intense      |
|              | Killing      |             | Unbearable   |
| 17 Spreading | 18 Tight     | 19 Cool     | 20 Nagging   |
| Radiating    | Numb         | Cold        | Nauseating   |
| Penetrating  | Drawing      | Freezing    | Agonizing    |
| Piercing     | Squeezing    |             | Dreadful     |
|              | Tearing      |             | Torturing    |

**Part 3. How Does Your Pain Change With Time?**

1. Which word or words would you use to describe the pattern of your pain?

|              |              |           |
|--------------|--------------|-----------|
| 1 Continuous | 2 Rhythmic   | 3 Brief   |
| Steady       | Periodic     | Momentary |
| Constant     | Intermittent | Transient |

2. What kind of things relieve your pain?

3. What kind of things increase your pain?

**Part 4. How Strong Is Your Pain?**

People agree that the following 5 words represent pain of increasing intensity. They are:

|        |                 |               |            |                |
|--------|-----------------|---------------|------------|----------------|
| 1 Mild | 2 Discomforting | 3 Distressing | 4 Horrible | 5 Excruciating |
|--------|-----------------|---------------|------------|----------------|

To answer each question below, write the number of the most appropriate word in the space beside the question.

1. Which word describes your pain right now? \_\_\_\_\_
2. Which word describes it at its worst? \_\_\_\_\_
3. Which word describes it when it is least? \_\_\_\_\_
4. Which word describes the worst toothache you ever had? \_\_\_\_\_
5. Which word describes the worst headache you ever had? \_\_\_\_\_
6. Which word describes the worst stomach-ache you ever had? \_\_\_\_\_

**eTool 1.1** McGill-Melzack pain questionnaire. (From Melzack R. The McGill pain questionnaire: major properties and scoring methods. *Pain*. 1975;1:280–281.)

| SHORT-FORM MCGILL PAIN QUESTIONNAIRE<br>RONALD MELZACK |          |             |          |          |
|--------------------------------------------------------|----------|-------------|----------|----------|
| PATIENT'S NAME: _____                                  |          | DATE: _____ |          |          |
|                                                        | NONE     | MILD        | MODERATE | SEVERE   |
| 1. THROBBING                                           | 0) _____ | 1) _____    | 2) _____ | 3) _____ |
| 2. SHOOTING                                            | 0) _____ | 1) _____    | 2) _____ | 3) _____ |
| 3. STABBING                                            | 0) _____ | 1) _____    | 2) _____ | 3) _____ |
| 4. SHARP                                               | 0) _____ | 1) _____    | 2) _____ | 3) _____ |
| 5. CRAMPING                                            | 0) _____ | 1) _____    | 2) _____ | 3) _____ |
| 6. GNAWING                                             | 0) _____ | 1) _____    | 2) _____ | 3) _____ |
| 7. HOT-BURNING                                         | 0) _____ | 1) _____    | 2) _____ | 3) _____ |
| 8. ACHING                                              | 0) _____ | 1) _____    | 2) _____ | 3) _____ |
| 9. HEAVY                                               | 0) _____ | 1) _____    | 2) _____ | 3) _____ |
| 10. TENDER                                             | 0) _____ | 1) _____    | 2) _____ | 3) _____ |
| 11. SPLITTING                                          | 0) _____ | 1) _____    | 2) _____ | 3) _____ |
| 12. TIRING-EXHAUSTING                                  | 0) _____ | 1) _____    | 2) _____ | 3) _____ |
| 13. SICKENING                                          | 0) _____ | 1) _____    | 2) _____ | 3) _____ |
| 14. FEARFUL                                            | 0) _____ | 1) _____    | 2) _____ | 3) _____ |
| 15. PUNISHING-CRUEL                                    | 0) _____ | 1) _____    | 2) _____ | 3) _____ |

|                 |       |          |
|-----------------|-------|----------|
| -----           |       | 10       |
| 0               |       |          |
| NO              |       | WORST    |
| PAIN            |       | POSSIBLE |
| P P I           |       | PAIN     |
| 0 NO PAIN       | _____ |          |
| 1 MILD          | _____ |          |
| 2 DISCOMFORTING | _____ |          |
| 3 DISTRESSING   | _____ |          |
| 4 HORRIBLE      | _____ |          |
| 5 EXCRUCIATING  | _____ |          |

**eTool 1.2** The short-form McGill pain questionnaire. Descriptors 1 to 11 represent the sensory dimension of pain experience, and descriptors 12 to 15 represent the affective dimension. Each descriptor is ranked on an intensity scale of 0 = none, 1 = mild, 2 = moderate, 3 = severe. The present pain intensity (*PPi*) of the standard long-form McGill pain questionnaire and the visual analog scale are also included to provide overall intensity scores. For actual examination, line would be 10 cm long. (Modified from Melzack R. The short-form McGill pain questionnaire. *Pain*. 1987;30:193.)

### Pain Rating Scale

#### Instructions:

Below is a thermometer with various grades of pain on it from "No pain at all" to "The pain is almost unbearable." Put an X by the words that describe your pain best. Mark how bad your pain is **at this moment in time**.

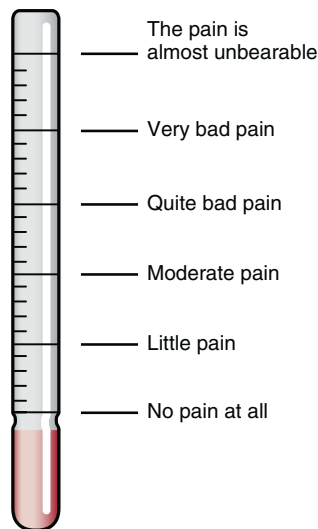


**Figure 1.3** “Thermometer” pain rating scale. (Redrawn from Brodie DJ, Burnett JV, Walker JM, et al. Evaluation of low back pain by patient questionnaires and therapist assessment. *J Orthop Sports Phys Ther.* 1990;11[11]:528.)

Morning pain with stiffness that improves with activity usually indicates chronic inflammation and edema, which decrease with motion. Pain or aching as the day progresses usually indicates increased congestion in a joint. Pain at rest and pain that is worse at the beginning of activity than at the end implies acute inflammation. Pain that is not affected by rest or activity usually indicates bone pain or could be related to organic or systemic disorders, such as cancer or diseases of the viscera. The **Roles-Maudsley Score** is sometimes used as a 4-point assessment of pain and limitations of activity.

#### The Roles-Maudsley Satisfaction Score<sup>a</sup>

|         |                                                                                                 |
|---------|-------------------------------------------------------------------------------------------------|
| Grade 1 | Excellent—no symptoms, no pain, full movement and activity (no symptoms following treatment)    |
| Grade 2 | Good—occasional discomfort, full movement and activity (significant improvement from treatment) |
| Grade 3 | Fair—some discomfort after prolonged activity (somewhat improved after treatment)               |
| Grade 4 | Poor—pain limits activities (symptoms unchanged or worse after treatment)                       |

<sup>a</sup>Posttreatment scores of patient satisfaction.

Chronic pain is often associated with multiple factors, such as fatigue or certain postures or activities. If the pain occurs at night, how does the patient lie in bed: supine, on the side, or prone? Does sleeping alter the pain, or does the patient wake when he or she changes position? Intractable pain at night may indicate serious pathology (e.g., a tumor). Movement seldom affects visceral pain unless the movement compresses or stretches the structure.<sup>20</sup> Symptoms of peripheral nerve entrapment (e.g., carpal tunnel syndrome) and thoracic outlet syndromes tend to be worse at night. Pain and cramping with prolonged walking may indicate lumbar spinal stenosis (neurogenic intermittent claudication) or vascular problems (circulatory or vascular intermittent claudication). Intervertebral disc pain is aggravated by sitting and bending forward. Facet joint pain is often relieved by sitting and bending forward and is aggravated by extension and rotation. What type of mattress and pillow does the patient use? Foam pillows often cause more problems for persons with cervical disorders because these pillows have more “bounce” to them than do feather or buckwheat pillows. Too many pillows, pillows improperly positioned, or too soft a mattress may also cause problems.

15. *What type or quality of pain is exhibited?* **Nerve pain** tends to be sharp (lancinating), bright, and burning and also tends to run in the distribution of specific nerves. Thus the examiner must have detailed knowledge of the sensory distribution of nerve roots (dermatomes) and peripheral nerves because the different distributions may tell where the pathology or problem is if the nerve is involved. **Bone pain** tends to be deep, boring, and localized. **Vascular pain** tends to be diffuse, aching, and poorly localized and may be referred to other areas of the body. **Muscle pain** is usually hard to localize, is dull and aching, is often aggravated by injury, and may be referred to other areas (Table 1.3). If a muscle is injured, when the muscle contracts or is stretched, the pain will increase. Inert tissue, such as ligaments, joint capsules, and bursa, tends to exhibit pain similar to muscle pain and may be indistinguishable from muscle pain in the resting state (e.g., when the examiner is taking the history); however, pain in inert tissue is increased when the structures are stretched or pinched. Each of these specific tissue pains is sometimes grouped as **neuropathic pain** and follows specific anatomic pathways and affect specific anatomic structures.<sup>27</sup> The Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) Pain Scale (eTool 1.3) has been developed to determine if neuropathic causes dominate the pain experience.<sup>44</sup> In contrast, **somatic pain** is a severe chronic or aching pain that is inconsistent with injury or pathology to specific anatomic structures and cannot be explained by any physical cause because the sensory input can come from so many different structures supplied by the same nerve root.<sup>21</sup> Superficial somatic pain may be localized, but deep somatic pain is more diffuse and may be referred.<sup>45</sup> On examination, somatic pain may be reproduced, but visceral pain is not reproduced by movement.<sup>45</sup>

16. *What types of sensations does the patient feel, and where are these abnormal sensations?* If the problem is in bone,

**THE LANSS PAIN SCALE****Leeds Assessment of Neuropathic Symptoms and Signs**

NAME \_\_\_\_\_ DATE \_\_\_\_\_

This pain scale can help to determine whether the nerves that are carrying your pain signals are working normally or not. It is important to find this out in case different treatments are needed to control your pain.

**A. PAIN QUESTIONNAIRE**

- Think about how your pain has felt over the last week.
- Please say whether any of the descriptions match your pain exactly.

**1) Does your pain feel like strange, unpleasant sensations in your skin? Words like pricking, tingling, pins and needles might describe these sensations.**

- a) NO - My pain doesn't really feel like this ..... (0)
- b) YES - I get these sensations quite a lot ..... (5)

**2) Does your pain make the skin in the painful area look different from normal? Words like mottled or looking more red or pink might describe the appearance.**

- a) NO - My pain doesn't affect the colour of my skin ..... (0)
- b) YES - I've noticed that the pain does make my skin look different from normal ..... (5)

**3) Does your pain make the affected skin abnormally sensitive to touch? Getting unpleasant sensations when lightly stroking the skin, or getting pain when wearing tight clothes might describe the abnormal sensitivity.**

- a) NO - My pain doesn't make my skin abnormally sensitive in that area ..... (0)
- b) YES - My skin seems abnormally sensitive to touch in that area ..... (3)

**4) Does your pain come on suddenly and in bursts for no apparent reason when you're still. Words like electric shocks, jumping, and bursting describe these sensations.**

- a) NO - My pain doesn't really feel like this ..... (0)
- b) YES - I get these sensations quite a lot ..... (2)

**5) Does your pain feel as if the skin temperature in the painful area has changed abnormally? Words like hot and burning describe these sensations.**

- a) NO - I don't really get these sensations ..... (0)
- b) YES - I get these sensations quite a lot ..... (1)

**B. SENSORY TESTING**

Skin sensitivity can be examined by comparing the painful area with a contralateral or adjacent non-painful area for the presence of allodynia and an altered pinprick threshold (PPT).

**1) ALLODYNIA (Pain caused by something that normally would not cause pain)**

Examine the response to lightly stroking cotton wool across the non-painful area and then the painful area. If normal sensations are experienced in the non-painful site, but pain or unpleasant sensations (e.g., tingling, nausea) are experienced in the painful area when stroking, allodynia is present.

- a) NO, normal sensation in both areas ..... (0)
- b) YES, allodynia in painful area only ..... (5)

**2) ALTERED PINPRICK THRESHOLD**

Determine the pinprick threshold by comparing the response to a 23-gauge (blue) needle mounted inside a 2-mL syringe barrel placed gently on to the skin in a non-painful and then painful areas.

If a sharp pinprick is felt in the non-painful area, but a different sensation is experienced in the painful area (e.g., none/blunt only [raised PPT] or a very painful sensation [lowered PPT]), an altered PPT is present.

If a pinprick is not felt in either area, mount the syringe onto the needle to increase the weight and repeat.

- a) NO, equal sensation in both areas ..... (0)
- b) YES, altered PPT in painful area ..... (3)

**SCORING:**

Add values in parentheses for sensory description and examination findings to obtain overall score.

**TOTAL SCORE (maximum 24)** .....

If score <12, neuropathic mechanisms are **unlikely** to be contribution to the patient's pain.

If score ≥12, neuropathic mechanisms are **likely** to be contribution to the patient's pain.

**eTool 1.3** The Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) Pain Scale. (Modified from Bennett M. The LANSS Pain Scale: the Leeds assessment of neuropathic symptoms and signs. *Pain*. 2001;92:156–157.)

TABLE 1.3

## Pain Descriptions and Related Structures

| Type of Pain                             | Structure               |
|------------------------------------------|-------------------------|
| Cramping, dull, aching                   | Muscle                  |
| Dull, aching                             | Ligament, joint capsule |
| Sharp, shooting                          | Nerve root              |
| Sharp, bright, lightning-like            | Nerve                   |
| Burning, pressure-like, stinging, aching | Sympathetic nerve       |
| Deep, nagging, dull                      | Bone                    |
| Sharp, severe, intolerable               | Fracture                |
| Throbbing, diffuse                       | Vasculature             |

there usually is very little radiation of pain. If pressure is applied to a nerve root, radicular pain (radiating pain) results from pressure on the dura mater, which is the outermost covering of the spinal cord. If there is pressure on the nerve trunk, no pain occurs, but there is paresthesia, or an abnormal sensation, such as a “pins and needles” feeling or tingling. Paresthesia is an unpleasant sensation that occurs without an apparent stimulus or cause (to the patient). Autonomic pain is more likely to be a burning type of pain. If the nerve itself is affected, regardless of where the irritation occurs along the nerve, the brain perceives the pain as coming from the periphery. This is an example of **referred pain**.

17. *Does a joint exhibit locking, unlocking, twinges, instability, or giving way?* Seldom does locking mean that the joint will not move at all. **Locking** may mean that the joint cannot be fully extended, as is the case with a meniscal tear in the knee, or it may mean that it does not extend one time and does not flex the next time (**pseudolocking**), as in the case of a loose body moving within the joint. Locking may mean that the joint cannot be put through a full ROM because of muscle spasm or because the movement was too fast; this is sometimes referred to as **spasm locking**. **Giving way** is often caused by reflex inhibition or weakness of the muscles, and so the patient feels that the limb will buckle if weight is placed on it or the pain will be too great. Inhibition may be caused by anticipated pain or instability.

In nonpathological states, excessive ROM in a joint is called **laxity** or **hypermobility**. Laxity implies the patient has excessive ROM but can control movement in that range and no pathology is present. It is a function of the ligaments and joint capsule resistance.<sup>46</sup> This differs from flexibility, which is the ROM available in one or more joints and is a function of contractile tissue resistance primarily as well as ligament and joint capsule resistance.<sup>46</sup> Gleim and McHugh<sup>46</sup> describe flexibility in two parts: static and dynamic. Static flexibility is related to the ROM available in one or more joints; dynamic flexibility is related to stiffness and ease of movement. Laxity may be caused by familial factors or may be job or activity (e.g., sports) related. In any case, laxity, when found, should be considered normal (Fig. 1.4). If symptoms occur, then laxity is considered to



**Figure 1.4** Congenital laxity at the elbow leading to hyperextension. This may also be called *nonpathological hypermobility*.

be hypermobility and has a pathological component, which commonly indicates the patient's inability to control the joint during movement, especially at end range, which implies instability of the joint. Instability can cover a wide range of pathological hypermobility from a loss of control of arthrokinematic joint movements to anatomic instability where subluxation or dislocation is imminent or has occurred. For assessment purposes, instability can be divided into translational (loss of arthrokinematic control) and anatomic (dislocation or subluxation) instability.<sup>47</sup> **Translational instability** (also called *pathological* or *mechanical instability*) refers to loss of control of the small, arthrokinematic joint movements (e.g., spin, slide, roll, translation) that occur when the patient attempts to stabilize (statically or dynamically) the joint during movement. **Anatomic instability** (also called *clinical* or *gross instability*, or *pathological hypermobility*) refers to excessive or gross physiological movement in a joint where the patient becomes apprehensive at the end of the ROM because a subluxation or dislocation is imminent. It should be noted that there is confusion in the application of the terms used to describe the two types of instability. For example, mechanical instability is sometimes used to mean anatomic instability because of anatomic or pathological dysfunction. **Functional instability** may mean either or both types of instability and implies an inability to control either arthrokinematic or osteokinematic movement in the available ROM either consciously or unconsciously during functional movement. These instabilities

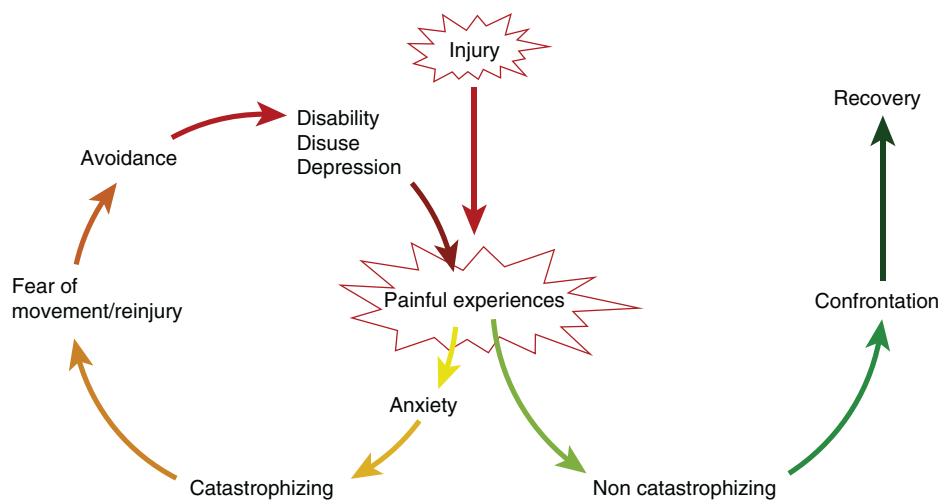


**Figure 1.5** Pathways normally followed after injury (*right*) and pathways followed by patient who fears movement will increase pain or cause reinjury (*left*). (Modified from Waddell G, Newton M, Henderson I, et al. A fear-avoidance beliefs questionnaire [FABQ] and the role of fear-avoidance beliefs in chronic low back pain and disability. *Pain*. 1993;52:157–168.)

are more likely to be evident during high-speed or loaded movements. Both types of instability can cause symptoms, and treatment centers on teaching the patient to develop muscular control of the joint and to improve reaction time and proprioceptive control. Both types of instability may be voluntary or involuntary. **Voluntary instability** is initiated by muscle contraction, and **involuntary instability** is the result of positioning. Another concept worth remembering during assessment for instability is the **circle concept of instability**, which was originally developed from shoulder studies<sup>48,49</sup> but is equally applicable to other joints. This concept states that injury to structures on one side of a joint leading to instability can, at the same time, cause injury to structures on the other side or other parts of the joint. Thus an anterior shoulder dislocation can lead to injury of the posterior capsule. Similarly, anterolateral rotary instability of the knee leads to injury to posterior structures (e.g., arcuate-popliteus complex, posterior capsule) as well as anterior (e.g., anterior cruciate ligament) and lateral (e.g., lateral collateral ligament) structures. Thus the examiner must be aware of potential injuries on the opposite side of the joint even if symptoms are predominantly on one side, especially when the mechanism of injury is trauma.

18. *Has the patient experienced any bilateral spinal cord symptoms, fainting, or drop attacks?* Is bladder function normal? Is there any “saddle” involvement (abnormal sensation in the perianal region, buttocks, and superior aspect of the posterior thighs) or vertigo? “Vertigo” and “dizziness” are terms often used synonymously, although vertigo usually indicates more severe symptoms. The terms describe a swaying, spinning sensation accompanied by feelings of unsteadiness and loss of balance. These symptoms indicate severe neurological problems, such as cervical myelopathy, which must be dealt with carefully and can (e.g., in cases of altered bladder function) be emergency conditions potentially requiring surgery. Drop attacks

occur when the patient suddenly falls without warning or provocation but remains conscious.<sup>27</sup> It is caused by neurological dysfunction, especially in the brain.

19. *Are there any changes in the color of the limb?* Ischemic changes resulting from circulatory problems may include white, brittle skin; loss of hair; and abnormal nails on the foot or hand. Conditions such as reflex sympathetic dystrophy, which is an autonomic nerve response to trauma, however minor, can cause these symptoms, as can circulatory problems such as Raynaud disease.
20. *Has the patient been experiencing any life or economic stresses?* These psychological stressors are sometimes considered to be **yellow flags** that alter both the assessment and subsequent treatment.<sup>50,51</sup> Divorce, marital problems, financial problems, or job stress or insecurity can contribute to increasing the pain or symptoms because of psychological stress. What support systems and resources are available? Are there any cultural issues one should be aware of? Does the patient have an easily accessible living environment? Each of these issues may increase stress to the patient. Pain is often accentuated in patients with anxiety, depression, or hysteria, or patients may exaggerate their symptoms (**symptom magnification**) in the absence of objective signs, which may be called **psychogenic pain**.<sup>4,52,53</sup> Thus psychosocial aspects can play a significant role with injury.<sup>54–57</sup> Because of the importance of these psychosocial aspects related to movement such as anxiety, questionnaires such as the Fear-Avoidance Beliefs Questionnaire (FABQ)<sup>58</sup> (eTool 1.4) and the Tampa Scale for Kinesiophobia (eTool 1.5)<sup>59–64</sup> have been developed.<sup>59,65–67</sup> Most of the studies related to the psychosocial aspects of injury have been related to the low back but could be used for other joints. The focus of these questionnaires is on the patient’s beliefs about how physical activity and work affect his or her injury and pain.<sup>55,68,69</sup> Fig. 1.5 outlines the different pathways

### Fear-Avoidance Beliefs Questionnaire (FABQ)

Here are some of the things which other patients have told us about their pain. For each statement please circle any number from 0 to 6 to say how much physical activities such as bending, lifting, walking, or driving affect or would affect *your* back pain.

|                                                                           | Completely disagree |   | Unsure |   | Completely agree |
|---------------------------------------------------------------------------|---------------------|---|--------|---|------------------|
| 1. My pain was caused by physical activity .....                          | 0                   | 1 | 2      | 3 | 4 5 6            |
| 2. Physical activity makes my pain worse .....                            | 0                   | 1 | 2      | 3 | 4 5 6            |
| 3. Physical activity might harm my back .....                             | 0                   | 1 | 2      | 3 | 4 5 6            |
| 4. I should not do physical activities which (might) make my pain worse   | 0                   | 1 | 2      | 3 | 4 5 6            |
| 5. I cannot do physical activities which (might) make my pain worse ..... | 0                   | 1 | 2      | 3 | 4 5 6            |

The following statements are about how your normal work affects or would affect your back pain

|                                                                           | Completely disagree |   | Unsure |   | Completely agree |
|---------------------------------------------------------------------------|---------------------|---|--------|---|------------------|
| 6. My pain was caused by my work or by an accident at work .....          | 0                   | 1 | 2      | 3 | 4 5 6            |
| 7. My work aggravated my pain .....                                       | 0                   | 1 | 2      | 3 | 4 5 6            |
| 8. I have a claim for compensation for my pain .....                      | 0                   | 1 | 2      | 3 | 4 5 6            |
| 9. My work is too heavy for me .....                                      | 0                   | 1 | 2      | 3 | 4 5 6            |
| 10. My work makes or would make my pain worse .....                       | 0                   | 1 | 2      | 3 | 4 5 6            |
| 11. My work might harm my back .....                                      | 0                   | 1 | 2      | 3 | 4 5 6            |
| 12. I should not do my normal work with my present pain .....             | 0                   | 1 | 2      | 3 | 4 5 6            |
| 13. I cannot do my normal work with my present pain .....                 | 0                   | 1 | 2      | 3 | 4 5 6            |
| 14. I cannot do my normal work till my pain is treated .....              | 0                   | 1 | 2      | 3 | 4 5 6            |
| 15. I do not think that I will be back to my normal work within 3 months. | 0                   | 1 | 2      | 3 | 4 5 6            |
| 16. I do not think that I will ever be able to go back to that work ..... | 0                   | 1 | 2      | 3 | 4 5 6            |

#### Scoring:

fear-avoidance beliefs about work (scale 1) = (points for item 6) + (points for item 7) + (points for item 9) + (points for item 10) + (points for item 11) + (points for item 12) + (points for item 15)

fear-avoidance beliefs about physical activity (scale 2) = (points for item 2) + (points for item 3) + (points for item 4) + (points for item 5)

Items not in scale 1 or 2: 1 8 13 14 16

#### Interpretation:

- Minimal scale scores: 0
- Maximum scale 1 score: 42 (7 items)
- Maximum scale 2 score: 24 (4 items)
- The higher the scale scores the greater the degree of fear and avoidance beliefs shown by the patient.

**eTool 1.4** Fear-Avoidance Beliefs Questionnaire (FABQ). (Modified from Waddell G, Newton M, Henderson I, et al. A fear-avoidance beliefs questionnaire [FABQ] and the role of fear-avoidance beliefs in chronic low back pain and disability. *Pain*. 1993;52:166.)

**Tampa Scale for Kinesiophobia**  
(Miller, Kori, and Todd 1991)

- 1 = Strongly disagree  
2 = Disagree  
3 = Agree  
4 = Strongly agree

|                                                                                                                                      |   |   |   |   |
|--------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|
| 1. I'm afraid that I might injure myself if I exercise                                                                               | 1 | 2 | 3 | 4 |
| 2. If I were to try to overcome it, my pain would increase                                                                           | 1 | 2 | 3 | 4 |
| 3. My body is telling me I have something dangerously wrong                                                                          | 1 | 2 | 3 | 4 |
| 4. My pain would probably be relieved if I were to exercise                                                                          | 1 | 2 | 3 | 4 |
| 5. People aren't taking my medical condition seriously enough                                                                        | 1 | 2 | 3 | 4 |
| 6. My accident has put my body at risk for the rest of my life                                                                       | 1 | 2 | 3 | 4 |
| 7. Pain always means I have injured my body                                                                                          | 1 | 2 | 3 | 4 |
| 8. Just because something aggravates my pain does not mean it is dangerous                                                           | 1 | 2 | 3 | 4 |
| 9. I am afraid that I might injure myself accidentally                                                                               | 1 | 2 | 3 | 4 |
| 10. Simply being careful that I do not make any unnecessary movements is the safest thing I can do to prevent my pain from worsening | 1 | 2 | 3 | 4 |
| 11. I wouldn't have this much pain if there wasn't something potentially dangerous going on in my body                               | 1 | 2 | 3 | 4 |
| 12. Although my condition is painful, I would be better off if I was physically active                                               | 1 | 2 | 3 | 4 |
| 13. Pain lets me know when to stop exercising so that I don't injure myself                                                          | 1 | 2 | 3 | 4 |
| 14. It's really not safe for a person with a condition like mine to be physically active                                             | 1 | 2 | 3 | 4 |
| 15. I can't do all the things normal people do because it's too easy for me to get injured                                           | 1 | 2 | 3 | 4 |
| 16. Even though something is causing me a lot of pain, I don't think it's actually dangerous                                         | 1 | 2 | 3 | 4 |
| 17. No one should have to exercise when he/she is in pain                                                                            | 1 | 2 | 3 | 4 |

A total score is calculated after inversion of the individual scores of items 4, 8, 12, and 16.

**eTool 1.5** Tampa Scale for Kinesiophobia. A total score is calculated after inversion of the individual scores of items 4, 8, 12, and 16.<sup>64,65</sup> (From Vlaeyen J, Kole-Snijders A, Boeren R, van Eek H. Fear of movement/(re) injury in chronic low back pain and its relation to behavioral performance. *Pain*. 1995;62:371.)

TABLE 1.4

## Summary of Psychological Processes

| Factor                          | Description                                                                                                                                       | Possible Effect on Pain and Disability                                                                                                                                                                                                                                                                                                                                                                                                    | Example of Treatment Strategy                                                                                                                                                                                                                                                   |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Attention                       | Pain demands our attention                                                                                                                        | <ul style="list-style-type: none"> <li>Vigilance may increase pain intensity</li> <li>Distraction may decrease its pain intensity</li> </ul>                                                                                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>Distraction techniques</li> <li>Interoceptive exposure</li> </ul>                                                                                                                                                                        |
| Cognitions                      | How we think about our pain may influence it                                                                                                      | <ul style="list-style-type: none"> <li>Interpretations and beliefs may increase pain and disability</li> <li>Catastrophizing (irrational thoughts that something is far worse than it is) may increase pain</li> <li>Negative thoughts and beliefs may increase pain and disability</li> <li>Expectations may influence pain and disability</li> <li>Cognitive sets may reduce flexibility in dealing with pain and disability</li> </ul> | <ul style="list-style-type: none"> <li>Cognitive restructuring</li> <li>Behavioral experiments designed, for example, to disconfirm unrealistic expectations and catastrophizing</li> </ul>                                                                                     |
| Emotions and emotion regulation | Pain often generates negative feelings; these negative feelings may influence the pain as well as fuel cognitions, attention, and overt behaviors | <ul style="list-style-type: none"> <li>Fear may increase avoidance behavior and disability</li> <li>Anxiety may increase pain disability</li> <li>Depression may increase pain disability</li> <li>Distress, in general, fuels negative cognitions and pain disability</li> <li>Positive emotions might decrease pain</li> </ul>                                                                                                          | <ul style="list-style-type: none"> <li>Cognitive-behavioral therapy programs for anxiety and depression</li> <li>Activation (to increase positive emotion)</li> <li>Relaxation</li> <li>Positive psychology techniques that promote well-being and positive emotions</li> </ul> |
| Overt behavior                  | What we do to cope with our pain influences our perception of pain                                                                                | <ul style="list-style-type: none"> <li>Avoidance behavior may increase disability</li> <li>Unlimited activity (overactivity) may provoke pain</li> <li>Pain behaviors communicate pain</li> </ul>                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Operant, graded activity-training</li> <li>Exposure in vivo</li> <li>Coping strategies training</li> </ul>                                                                                                                               |

Modified from Linton SJ, Shaw WS. Impact of psychological factors in the experience of pain. *Phys Ther.* 2011;91:703.

 **TABLE 1.5**  
Summary of Different Types of Psychological Flags

| Flag   | Nature                                                     | Examples                                                                                                                                                                                                                                                                                |
|--------|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Red    | Signs of serious pathology                                 | <ul style="list-style-type: none"> <li>Cauda equina syndrome, fracture, tumor</li> </ul>                                                                                                                                                                                                |
| Orange | Psychiatric symptoms                                       | <ul style="list-style-type: none"> <li>Clinical depression, personality disorder</li> </ul>                                                                                                                                                                                             |
| Yellow | Beliefs, appraisals, and judgments                         | <ul style="list-style-type: none"> <li>Unhelpful beliefs about pain: indication of injury as uncontrollable or likely to worsen</li> </ul>                                                                                                                                              |
|        | Emotional responses                                        | <ul style="list-style-type: none"> <li>Expectations of poor treatment outcome, delayed return to work</li> <li>Distress not meeting criteria for diagnosis of mental disorder</li> <li>Worry, fears, anxiety</li> </ul>                                                                 |
|        | Pain behavior (including pain coping strategies)           | <ul style="list-style-type: none"> <li>Avoidance of activities due to expectations of pain and possible reinjury</li> <li>Over-reliance on passive treatments (hot packs, cold packs, analgesics)</li> </ul>                                                                            |
| Blue   | Perceptions about the relationship between work and health | <ul style="list-style-type: none"> <li>Belief that work is too onerous and likely to cause further injury</li> <li>Belief that workplace supervisor and workmates are unsupportive</li> </ul>                                                                                           |
| Black  | System or contextual obstacles                             | <ul style="list-style-type: none"> <li>Legislation restricting options for return to work</li> <li>Conflict with insurance staff over injury claim</li> <li>Overly solicitous family and health care providers</li> <li>Heavy work, with little opportunity to modify duties</li> </ul> |

From Nicholas MK, Linton SJ, Watson PJ, et al. Early identification and management of psychological risk factors (yellow flags) in patients with low back pain: a reappraisal. *Phys Ther.* 2011;91:739.

normally followed after injury and the pathway followed in a patient who fears movement will increase the pain or cause reinjury.<sup>58</sup> Table 1.4 outlines some of the psychological processes affecting pain.<sup>55</sup> These processes have been divided into different colored “flags” (Table 1.5), but it is important to note that these psychological flags, other

than the red flag, are different from pathological “flags” previously mentioned.<sup>57</sup> Waddell and Main<sup>50</sup> consider illness behavior normal with patients who are exhibiting both a physical problem and varying degrees of illness behavior (Table 1.6). In these cases, it may be beneficial to determine the level of psychological stress or to refer the

TABLE 1.6

## Spectrum of Clinical Symptoms and Signs

|                       | Physical Disease                                               | Illness Behavior                                       |
|-----------------------|----------------------------------------------------------------|--------------------------------------------------------|
| <b>Pain</b>           |                                                                |                                                        |
| Pain drawing          | Localized<br>Anatomic                                          | Nonanatomic<br>Regional<br>Magnified                   |
| Pain adjectives       | Sensory                                                        | Emotional                                              |
| <b>Symptoms</b>       |                                                                |                                                        |
| Pain                  | Musculoskeletal or neurological distribution                   | Whole leg pain<br>Pain at the tip of the tailbone      |
| Numbness              | Dermatomal                                                     | Whole leg numbness                                     |
| Weakness              | Myotomal                                                       | Whole leg giving way                                   |
| Time pattern          | Varies with time and activity                                  | Never free of pain                                     |
| Response to treatment | Variable benefit                                               | Intolerance of treatments<br>Emergency hospitalization |
| <b>Signs</b>          |                                                                |                                                        |
| Tenderness            | Musculoskeletal distribution                                   | Superficial<br>Nonanatomic                             |
| Axial loading         | Neck pain                                                      | Low back pain                                          |
| Simulated rotation    | Nerve root pain                                                | Low back pain                                          |
| Straight leg raising  | Limited on formal examination<br>No improvement on distraction | Marked improvement with distraction                    |
| Motor                 | Myotomal                                                       | Regional, jerky, giving way                            |
| Sensory               | Dermatomal                                                     | Regional                                               |

From Waddell G, Main CJ. Illness behavior. In: Waddell G, ed. *The Back Pain Revolution*. Churchill Livingstone; 1998:162.

patient to another appropriate health care professional.<sup>51</sup> When symptoms (such as pain) appear to be exaggerated, the examiner must also consider the possibility that the patient is malingering. Malingering implies trying to obtain a particular gain by a conscious effort to deceive.<sup>70</sup>

## Reactions to Stress

- Aches and pains
- Anxiety
- Changed appetite
- Chronic fatigue
- Difficulty concentrating
- Difficulty sleeping
- Irritability and impatience
- Loss of interest and enjoyment in life
- Muscle tension (headaches)
- Sweaty hands
- Trembling
- Withdrawal

21. *Does the patient have any chronic or serious systemic illnesses or adverse social habits (e.g., smoking, drinking) that may influence the course of the pathology or the treatment?*

In some cases, the examiner may use a medical history screening form (eTool 1.6) or a health status questionnaire<sup>71–73</sup> to determine the presence of conditions that may affect treatment or require referral to another health care professional.

22. *Is there anything in the family or developmental history that may be related, such as tumors, arthritis, heart disease, diabetes, allergies, and congenital anomalies?* Some disease processes and pathologies have a familial incidence.
23. *Has the patient undergone an x-ray examination or other imaging techniques?* If so, x-ray overexposure must be considered; if not, an x-ray examination may help to yield a diagnosis.
24. *Has the patient been receiving analgesic, steroid, or any other medication?* If so, for how long? High dosages of steroids taken for long periods may lead to problems, such as osteoporosis. Has the patient been taking any other medication that is pertinent? Anticoagulants (e.g., aspirin or anticoagulant therapy) increase the chance of bruising or hemarthrosis because the clotting mechanism is altered. Does the patient know why he or she was given a particular medication? Often, patients do not know and should be encouraged to keep an up-to-date list of the medications they are taking. Patients may not regard over-the-counter formulations, birth control pills, and so on

| Date:                                                                                                                                                                                                | DOB:           | Age:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
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| Patient's Name:                                                                                                                                                                                      | Date of Onset: |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Diagnosis:                                                                                                                                                                                           | Therapist:     | Precautions:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| <b>Medical History</b>                                                                                                                                                                               |                | <i>Do Not Complete, For Clinician</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Have you or any immediate family member ever been told you have:                                                                                                                                     | Circle one:    | <table border="1"> <thead> <tr> <th>Relation to Patient</th> <th>Date of Onset</th> <th>Current Status</th> </tr> </thead> <tbody> <tr><td>Cancer</td><td>Yes No</td><td></td></tr> <tr><td>Diabetes</td><td>Yes No</td><td></td></tr> <tr><td>Hypoglycemia</td><td>Yes No</td><td></td></tr> <tr><td>Hypertension or high blood pressure</td><td>Yes No</td><td></td></tr> <tr><td>Heart disease</td><td>Yes No</td><td></td></tr> <tr><td>Angina or chest pain</td><td>Yes No</td><td></td></tr> <tr><td>Shortness of breath</td><td>Yes No</td><td></td></tr> <tr><td>Stroke</td><td>Yes No</td><td></td></tr> <tr><td>Kidney disease/stones</td><td>Yes No</td><td></td></tr> <tr><td>Urinary tract infection</td><td>Yes No</td><td></td></tr> <tr><td>Allergies</td><td>Yes No</td><td></td></tr> <tr><td>Asthma, hay fever</td><td>Yes No</td><td></td></tr> <tr><td>Rheumatic/scarlet fever</td><td>Yes No</td><td></td></tr> <tr><td>Hepatitis/jaundice</td><td>Yes No</td><td></td></tr> <tr><td>Cirrhosis/liver disease</td><td>Yes No</td><td></td></tr> <tr><td>Polio</td><td>Yes No</td><td></td></tr> <tr><td>Chronic bronchitis</td><td>Yes No</td><td></td></tr> <tr><td>Pneumonia</td><td>Yes No</td><td></td></tr> <tr><td>Emphysema</td><td>Yes No</td><td></td></tr> <tr><td>Migraine headaches</td><td>Yes No</td><td></td></tr> <tr><td>Anemia</td><td>Yes No</td><td></td></tr> <tr><td>Ulcers/stomach problems</td><td>Yes No</td><td></td></tr> <tr><td>Arthritis/gout</td><td>Yes No</td><td></td></tr> <tr><td>Other</td><td>Yes No</td><td></td></tr> </tbody> </table> | Relation to Patient | Date of Onset | Current Status | Cancer | Yes No |  | Diabetes | Yes No |  | Hypoglycemia | Yes No |  | Hypertension or high blood pressure | Yes No |  | Heart disease | Yes No |  | Angina or chest pain | Yes No |  | Shortness of breath | Yes No |  | Stroke | Yes No |  | Kidney disease/stones | Yes No |  | Urinary tract infection | Yes No |  | Allergies | Yes No |  | Asthma, hay fever | Yes No |  | Rheumatic/scarlet fever | Yes No |  | Hepatitis/jaundice | Yes No |  | Cirrhosis/liver disease | Yes No |  | Polio | Yes No |  | Chronic bronchitis | Yes No |  | Pneumonia | Yes No |  | Emphysema | Yes No |  | Migraine headaches | Yes No |  | Anemia | Yes No |  | Ulcers/stomach problems | Yes No |  | Arthritis/gout | Yes No |  | Other | Yes No |  |
| Relation to Patient                                                                                                                                                                                  | Date of Onset  | Current Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Cancer                                                                                                                                                                                               | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Diabetes                                                                                                                                                                                             | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Hypoglycemia                                                                                                                                                                                         | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Hypertension or high blood pressure                                                                                                                                                                  | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Heart disease                                                                                                                                                                                        | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Angina or chest pain                                                                                                                                                                                 | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Shortness of breath                                                                                                                                                                                  | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Stroke                                                                                                                                                                                               | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Kidney disease/stones                                                                                                                                                                                | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Urinary tract infection                                                                                                                                                                              | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Allergies                                                                                                                                                                                            | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Asthma, hay fever                                                                                                                                                                                    | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Rheumatic/scarlet fever                                                                                                                                                                              | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Hepatitis/jaundice                                                                                                                                                                                   | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Cirrhosis/liver disease                                                                                                                                                                              | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Polio                                                                                                                                                                                                | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Chronic bronchitis                                                                                                                                                                                   | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Pneumonia                                                                                                                                                                                            | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Emphysema                                                                                                                                                                                            | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Migraine headaches                                                                                                                                                                                   | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Anemia                                                                                                                                                                                               | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Ulcers/stomach problems                                                                                                                                                                              | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Arthritis/gout                                                                                                                                                                                       | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| Other                                                                                                                                                                                                | Yes No         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| <b>Medical Testing</b>                                                                                                                                                                               |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| 1. Are you taking any prescription or over-the-counter medications?<br>If yes, please list:                                                                                                          |                | Yes No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| 2. Have you had any x-rays, sonograms, computed tomography (CT) scans, or magnetic resonance imaging (MRI) done recently?<br>If yes, when?                      Where?                      Results? |                | Yes No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| 3. Have you had any laboratory work done recently (urinalysis or blood tests)?<br>If yes, when?                      Where?                      Results?                                            |                | Yes No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| 4. Please list any operations that you have ever had and the date(s) of surgery.<br>Surgery/Date:                                                                                                    |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| <b>General Health</b>                                                                                                                                                                                |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |
| 1. Have you had any recent illnesses within the last 3 weeks (e.g., colds, influenza, bladder or kidney infection)?                                                                                  |                | Yes No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                     |               |                |        |        |  |          |        |  |              |        |  |                                     |        |  |               |        |  |                      |        |  |                     |        |  |        |        |  |                       |        |  |                         |        |  |           |        |  |                   |        |  |                         |        |  |                    |        |  |                         |        |  |       |        |  |                    |        |  |           |        |  |           |        |  |                    |        |  |        |        |  |                         |        |  |                |        |  |       |        |  |

**eTool 1.6** Medical history screening card. (From Goodman CC, Snyder TK. *Differential Diagnosis in Physical Therapy*. W.B. Saunders; 1990.)

|                                                                                                                               |     |              |
|-------------------------------------------------------------------------------------------------------------------------------|-----|--------------|
| 2. Have you noticed any lumps or thickening of skin or muscle anywhere on your body?                                          | Yes | No           |
| 3. Do you have any sores that have not healed or any changes in size, shape, or color of a wart or mole?                      | Yes | No           |
| 4. Have you had any unexplained weight loss in the last month?                                                                | Yes | No           |
| 5. Do you smoke or chew tobacco?<br>If yes, how many packs/day?<br>For how many months or years?                              | Yes | No           |
| 6. How much alcohol do you drink in the course of a week?                                                                     |     |              |
| 7. How much caffeine do you consume daily (including soft drinks, coffee, tea, or chocolate)?                                 |     |              |
| 8. Are you on any special diet prescribed by a physician?                                                                     | Yes | No           |
| <b>Special Questions for Women</b>                                                                                            |     |              |
| 1. Last Pap smear:                                                                                                            |     |              |
| 2. Last breast examination:                                                                                                   |     |              |
| 3. Do you perform a monthly self-breast examination?                                                                          | Yes | No           |
| 4. Do you take birth control pills or do you use an intrauterine device (IUD)?                                                | Yes | No           |
| <b>Special Questions for Men</b>                                                                                              |     |              |
| 1. Do you ever have difficulty with urination (e.g., difficulty in starting or continuing flow or a very slow flow of urine)? | Yes | No           |
| 2. Do you ever have blood in your urine?                                                                                      | Yes | No           |
| 3. Do you ever have pain on urination?                                                                                        | Yes | No           |
| <b>Work Environment</b>                                                                                                       |     |              |
| 1. Occupation:                                                                                                                |     |              |
| 2. Does your job involve:                                                                                                     |     |              |
| prolonged sitting (e.g., desk, computer, driving)                                                                             | Yes | No           |
| prolonged standing (e.g., equipment operator, sales clerk)                                                                    | Yes | No           |
| prolonged walking (e.g., mill worker, delivery service)                                                                       | Yes | No           |
| use of large or small equipment (e.g., telephone, fork lift, typewriter, drill press, cash register)                          | Yes | No           |
| lifting, bending, twisting, climbing, turning                                                                                 | Yes | No           |
| exposure to chemicals or gases                                                                                                | Yes | No           |
| other: please describe                                                                                                        |     |              |
| 3. Do you use any special supports:                                                                                           |     |              |
| back cushion, neck cushion                                                                                                    | Yes | No           |
| back brace, corset                                                                                                            | Yes | No           |
| other kind of brace or support for any body part                                                                              | Yes | No           |
| <b>For Clinician</b>                                                                                                          |     |              |
| Vital signs:                                                                                                                  |     |              |
| Resting pulse rate:                                                                                                           |     |              |
| Oral temperature:                                                                                                             |     |              |
| Blood pressure: 1st reading:                                                                                                  |     | 2nd reading: |
| Position:                                                                                                                     |     | Extremity:   |

eTool 1.6, cont'd

as medications. If such medications have been taken for a long period, their use may not seem pertinent to the patient. How long has the patient been taking the medication? When did he or she last take the medication? Did the medication help?<sup>74</sup> It is also important to determine whether medication is being taken for the condition under review. If analgesics or antiinflammatories were taken just before the patient's visit for the assessment, some symptoms may be masked.

25. *Does the patient have a history of surgery or past/present illness?* If so, when was the surgery performed, what was the site of operation, and what condition was being treated? Sometimes, the condition the examiner is asked to treat is the result of the surgery. Has the patient ever been hospitalized? If so, why? Health conditions such as high blood pressure, heart and circulatory problems, and systemic diseases (e.g., diabetes) should be noted because of their effect on healing, exercise prescription, and functional activities.<sup>4</sup>

Taking an accurate, detailed history is very important. **Listen to the patient—he or she is telling you what is wrong!**<sup>6</sup> While taking the history, the examiner, with experience, will commonly be generating a differential diagnosis in his or her mind and allows the patient's answers to direct any logical follow-up questions. As the history taking proceeds, the list of probable diagnoses is narrowed down until there are one or two possibilities which will then direct the rest of the assessment.<sup>3</sup> With experience, the examiner should be able to make a **preliminary “working” diagnosis** from the history alone. The observation and examination phases of the assessment are then used to confirm, alter, or refute the possible diagnoses. What an examiner looks for in observation and tests for in examination is often related to what she or he has found when taking a history.

## Observation

In an assessment, observation is the “looking” or inspection phase. Its purpose is to gain information on visible defects, functional deficits, and abnormalities of alignment. Much of the observation phase involves assessment of **normal standing posture** (see Chapter 15). Normal posture covers a wide range, and asymmetric findings are common. The key is to determine whether these findings are related to the pathology being presented. The examiner should note the patient's way of moving as well as the general posture, manner, attitude, willingness to cooperate, and any signs of overt pain behavior.<sup>75</sup> Observation may begin in the waiting room or as the patient is being taken to the assessment area. Often the patient is unaware that observation is occurring at this stage and may present a different picture. The patient must be adequately undressed in a private assessment area to be observed properly. Male patients should wear only shorts, and female patients should wear a bra or halter top and shorts. Because the patient is in a state of undress, it is essential for the examiner to explain that observation and detailed looking at the

patient are integral parts of the assessment. This explanation may prevent a potentially embarrassing situation that can have legal ramifications.

### Overt Pain Behavior<sup>75</sup>

- **Guarding**—Abnormally stiff, interrupted or rigid movement while moving the joint or body from one position to another
- **Bracing**—A stationary position in which a fully extended limb supports and maintains an abnormal distribution of weight
- **Rubbing**—Any contact between hand and injured area (i.e., touching, rubbing, or holding the painful area)
- **Grimacing**—Obvious facial expression of pain that may include furrowed brow, narrowed eyes, tightened lips, corners of mouth pulled back and clenched teeth
- **Sighing**—Obvious exaggerated exhalation of air usually accompanied by the shoulders first rising and then falling; patients may expand their cheeks first

As the patient enters the assessment area, the examiner should observe his or her gait (see Chapter 14). This initial gait assessment is only a cursory one; however, problems, such as Trendelenburg sign or drop foot, are easily noticed. If there appears to be an abnormality, the gait may be checked in greater detail after the patient has undressed.

The examiner should be positioned so that the dominant eye is used, and both sides of the patient should be compared simultaneously. During the observation stage, the examiner is looking only at the patient and does not ask the patient to move; the examiner usually does not palpate, except possibly to learn whether an area is warm or hot or to find specific landmarks.

After the patient has undressed, the examiner should observe the posture, looking for asymmetries and determining whether the asymmetries are significant or applicable to the problem being assessed. In doing so, the examiner should attempt to answer the following questions often by comparing both sides:

1. What is the normal body alignment? Anteriorly, the nose, xiphisternum, and umbilicus should be in a straight line. From the side, the tip of the ear, the tip of the acromion, the high point of the iliac crest, and the lateral malleolus (anterior aspect) should be in a straight line.
2. Is there any obvious deformity? Deformities may take the form of restricted ROM (e.g., flexion deformity), malalignment (e.g., genu varum), alteration in the shape of a bone (e.g., fracture), or alteration in the relationship of two articulating structures (e.g., subluxation, dislocation). **Structural deformities** are present even at rest; examples include torticollis, fractures, scoliosis, and kyphosis. **Functional deformities** are the result of assumed postures and disappear when posture is changed. For example, a scoliosis due to a short leg seen in an upright posture disappears on forward flexion. A pes planus (flatfoot) on weight-bearing may disappear on non-weight-bearing. **Dynamic deformities** are caused by muscle action and are

present when muscles contract or joints move. Therefore they are not usually evident when the muscles are relaxed. Dynamic deformities are more likely to be seen during the examination phase.

3. Are the bony contours of the body normal and symmetric, or is there an obvious deviation? The body is not perfectly symmetric, and deviation may have no clinical implications. For example, many people have a lower shoulder on the dominant side or demonstrate a slight scoliosis of the spine adjacent to the heart. However, any deviation should be noted because it may contribute to a more accurate diagnosis.
4. Are the soft-tissue contours (e.g., muscle, skin, fat) normal and symmetric? Is there any obvious muscle wasting?
5. Are the limb positions equal and symmetric? The examiner should compare limb size, shape, position, any atrophy, color, and temperature.
6. Because pelvic position plays such an important role in correct posture of the whole body, the examiner should determine if the patient can position the pelvis in the “**neutral pelvis**” position. This dynamic position is such that the anterior superior iliac spines are one-to-two finger widths lower than the posterior superior iliac spines on the same side in normal standing. When looking for the “neutral pelvis” position, the examiner must be able to answer three questions in the affirmative. If not, there are probably hypomobile and/or hypermobile structures affecting the pelvic position. The three questions are:
  - (1) Can the patient get into the “neutral pelvis” position? (If not, why not?)
  - (2) Can the patient hold the “neutral pelvis” position while doing distal dynamic movement? (If not, why not?)
  - (3) Can the patient control the dynamic “neutral pelvis” while doing dynamic movement (e.g., walking, running, jumping)?

If the answer to any of these questions is “no,” the examiner should consider adding pelvic “core muscle” control activities to any treatment protocol.

7. Are the color and texture of the skin normal? Does the appearance of the skin differ in the area of pain or symptoms, compared with other areas of the body? **Ecchymosis** or **bruising** indicates bleeding under the skin from injury to small veins and capillaries (Fig. 1.6). It may be due to a blow to a part of the body, application of pressure (e.g., when a patient squeezes a painful area to relieve pain), or may be associated with other serious conditions (e.g., potential for bruising increases if the patient is on blood thinner medication or has bleeding or circulatory disorders, such as deficiency in vitamin C, K, or B<sub>12</sub>, or autoimmune diseases). Bruises generally are flat and may be tender to touch and usually disappear in a few days. In some instances, especially in older adults, tiny blood vessels in the outer layer of the skin become more fragile and bruising may result for no identifiable reason. In some cases, ecchymosis may track away from the injury site because of gravity. Trophic changes in



**Figure 1.6** Ecchymosis around the knee following rupture of the quadriceps and dislocation of the patella. Note how the ecchymosis is tracking distally toward the foot because of gravity from the leg hanging dependent.

the skin resulting from peripheral nerve lesions include loss of skin elasticity, shiny skin, hair loss on the skin, and skin that breaks down easily and heals slowly. The nails may become brittle and ridged. Skin disorders (e.g., psoriasis) may affect joints (e.g., psoriatic arthritis). Cyanosis, or a bluish color to the skin, is usually an indication of poor blood perfusion. Redness indicates increased blood flow or inflammation. **Hematomas** are more serious bruising, and tend to be raised, hard, and painful. They tend to develop rapidly and are the result of pooling of blood from injury to larger blood vessels. **Contusions** are deep bruises which may be intermuscular, intramuscular, or bone bruises.

8. Are there any scars that indicate recent injury or surgery? Recent scars are red because they are still healing and contain capillaries; older scars are white and primarily avascular. Fibers of the dermis (skin) tend to run in one direction, along so-called cleavage or tension lines. Lacerations or surgical cuts along these lines produce less scarring. Cuts across joint flexion lines frequently produce excessive (hypertrophic) scarring. Some individuals are also prone to keloid (excessive) or hypertrophic scarring. Hypertrophic scars are scars that have excessive scar tissue but stay within the margins of the wound. Keloid scars expand beyond the margins of the wound. Are there any callosities, blisters, or inflamed bursae, indicative of excessive pressure or friction to the skin? Are there any sinuses